The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. X. No. 252 APRIL 12, 1924 Prepaid Annual Subscription United Kingdom, £1.1.0; Abroad, £1.6.0.

Contents

PAGE

EDITORIAL NOTES: The B.D.C. Annual Me g; Getting a Move On; Modifying the Safeguardin Act; Colloid Mills and Wood Preservation 371
Industrial Uses of Disintegrating Mills 374
The Late Sir James Dewar 376
Chemistry House: An Interview with Dr. E. F. Armstrong .. 377
Society of Glass Technology; Society of Public Analysts 378
Annual Meeting of the British Dyestuffs Corporation 379
Magadi Soda Company's Affairs 381
The Future of the British Dyestuffs Industry 382
CORRESPONDENCE 383
Estimation of Minute Percentages of Iron 383
Society of Chemical Industry: New Cobalt Extraction Process 384
Chemical Matters in Parliament 385
From Week to Week 387
References to Current Literature 388
Patent Literature 389
Market Reports and Current Prices 392
Company News; New Chemical Trade Mark 395
Commercial Intelligence; New Companies Registered 396

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE is 21s. per annum for the United Kingdom, and £1 abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.

Editorial and General Offices—8, Bouverie St., London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines)

B.D.C. Annual Meeting

THE annual meeting of the British Dyestuffs Corporation (reported on pp. 379-81) derived additional interest from the announcement by Sir William Alexander, M.P., of his decision to relinquish the managing directorship but to remain chairman of the company. The eager inquiry which the statement at once set in motion was perhaps the best testimony to the great part which he has taken in reducing the affairs of the Corporation to order and in changing a prospect which was all doubt and anxiety when he began into one of clearness and confident hope. His announcement was not unexpected, except to outsiders. He had intimated more than once that his mission was temporary, and the fact that he now feels justified in leaving the active central direction to others may be taken as proof of his own satisfaction with the work that has been done. It will not be easy to find a successor completely equipped for so onerous a position, and until the right man is discovered Sir William will continue to act both as chairman and as managing director. Controversial as so many of the matters have been with which he has been compelled to deal, it is remarkable how general now is the recognition of the value and soundness of his work.

Of the greatly improved position of the company something was said last week, and there is not much now to add, except to note the directors' decision to defer the reconstruction of capital until the negotiations between the Corporation and the German I.G. have reached a more definite stage. On this much-discussed subject little was added to our knowledge of details. It was emphasized, however, that there is to be no departure from the foundation principle of an independent British industry, that the colour-users are to be fully consulted as to any terms affecting them, and that the Government will be in a position to safeguard as they think fit the interests of other dyestuff manufacturing firms. It is clear that the terms of the agreement must presently be made public, and until then it will be impossible to form any definite judgment.

Getting a Move On

WHILE efforts are being made to think out the ideal scheme for a future Chemistry House, in which all the activities of chemical science and industry shall be centrally housed, Dr. E. F. Armstrong, the president of the Society of Chemical Industry, has been quietly looking around for an immediately practicable plan which may serve as a starting point. It is rather the British fashion to begin in this small way and work up to bigger things later. His plan has two advantages —it avoids large risks and it provides experience. A possible danger is that earlier work done in this way may have later to be scrapped, but that can generally be guarded against by arranging that the first steps are preparatory to others, and that the arrangements permit of easy and natural expansion. The danger does not seem to us to be present in Dr. Armstrong's proposals.

Shortly, his scheme provides for the purchase at an early date, if not at once, of premises near Victoria Station sufficiently large to accommodate the staffs of the Chemical Society, the Society of Chemical Industry, the Association of British Chemical Manufacturers, the Institution of Chemical Engineers, and other bodies, and to provide rooms for committee work and similar purposes. The capital cost is estimated at about £30,000, and this sum, there is good reason to think, would speedily become available. In the case of leasehold premises it would be necessary to arrange a sinking fund, so that the capital would be intact at the termination of the lease, and to provide for such current expenses as light, heat, service, and so on. Although these details are not yet worked out, it should be possible to cover all these expenses by a total annual expenditure rather less than the normal rent of such premises. This scheme would, for the first time, bring a nucleus of the existing chemical organisations under one roof; the officials of several societies would be working in close association, though

still under their own management, and members of various committees could attend to their duties in one building and at convenient times instead of having to run from one address to another. With good finance it might be possible to secure these positive and admitted advantages almost at once. The negative advantages are considerable also. The scheme leaves to the future the thorny question of organic union—which the societies might debate as long as the churches have been doing, and with as little result. They merely become co-tenants and in that act alone bring all their machinery and personnel appreciably closer together. Neither does the scheme prejudice any larger conception such as that of Mr. Marlow; it might, on the contrary, prepare the way for it. On a scale involving no very large risks it offers the possibility of a real experiment in the collective or federal idea, and if it brings nothing else it should at least bring useful practical experience.

The questions which the publication of Dr. Armstrong's proposals raise are simple and direct. Do the chemical societies really want to get together on some such experimental basis as that suggested? If so, will each one pass a resolution approving the scheme in principle and appoint one or two delegates to a joint committee to go into the details? Such a joint committee could reduce the idea to definite terms within a month, and each society could then decide finally whether to go in or to stay out. The situation may be a little complicated by the existence of the Federal Council, whose approval is assumed to be essential. But the plain truth is that this is a matter of business for the societies themselves, and the federal idea is much more likely to develop naturally out of practical joint action on their part than to filter downward from an Upper House which has derived no executive authority from anybody. The idea of a Federal Council is excellent, and the men who have promoted the idea are equally excellent; but the only real federation must be one definitely created by the societies or other bodies who appoint its members, who invest it with the necessary authority to act for them, and to whom it is directly responsible for its actions. A joint committee would, in fact, be such a council in substance, which is much more important than name. The practical question, therefore, is what the societies themselves think and resolve to do. If they really desire an approach towards unity, Dr. Armstrong's suggestions seem both to offer an opportunity and to apply a test. The onus is now on the societies.

Modifying the Safeguarding Act

THE changes announced this week by the President of the Board of Trade in reference to the Safeguarding of Industries Act do not touch either the dyestuffs or the fine chemical industries, and their effect, whether good or bad, will not be very extensive. The importation of dyestuffs is regulated independently by the Dyestuffs Act. The importation of synthetic organic chemicals and a number of other substances is governed by Part I. of the Act which came into force on October 1, 1921, and is to continue in force until the expiration of five years from the passing of the Act and no longer. These remain untouched. The Government decision applies only to Part II., which deals with the "prevention of dumping." This part of the Act provides for the making of orders where imported goods are sold or offered for sale here (a) at prices below the cost of production or (b) at prices which, by reason of depreciation in currency, are below the prices at which similar goods can be profitably manufactured in the United Kingdom. As regards the first ground the Act apparently will continue to run. As regards the second, the Government have decided not to introduce legislation to extend the duration of the Act, and consequently, so far as they apply to cases of depreciated currency, the provisions of Part I. and the duties imposed under them will lapse on August 19.

Colloid Mills and Wood Preservation

UP to a few years ago the only method of preparing colloidal suspensions and emulsions which appeared of industrial value was, with few exceptions, by chemical means, in which the material required in the disperse phase was produced under conditions which did not assist separation in the solid or liquid form. Now with the introduction of disintegrating mills, such as the Plauson and the Premier, the aspect of the industrial preparation of colloids is being entirely revolutionised, and becomes essentially mechanical. There is, of course, still the need in most cases for a dispersator or stabiliser to assist in the production of the colloid or to render it permanent. In the case of the Premier mill, which was dealt with exhaustively by Mr. F. J. C. China in his recent paper in Birmingham, the disintegration is obtained by passing the material along with a suitable liquid between what is virtually a rapidly rotating disc and a fixed plate very close to it. There is no hammering action in the mill, the whole effect being a result of the shearing stresses applied.

It is natural that with a comparatively new invention such as these mills there should be a number of problems still awaiting solution, but the results so far obtained are sufficiently striking to suggest that the future possibilities may revolutionise many industrial processes. It is interesting to note that in America there is strong competition in the production of colloidal sulphur by mechanical means and by chemical means. Perhaps the most striking example dealt with by Mr. China, and one which has obviously been worked out very fully on the practical side, was the adaptation of the mill to the creosoting of wood. As is well known, in the ordinary way, in order to secure proper penetration of the creosote so that the centre of the wood can be preserved, it is necessary to use far more creosote than is required to protect the outer portions. By means of the mill, however, a stable emulsion of creosote in water can be prepared, which readily penetrates the wood and in course of time the water dries out, leaving an even deposit of creosote right through the wood. In this way it is possible to obtain a saving of something like 70 per cent. in the weight of creosote, a result which should be sufficient to make the process of great value, provided the initial prejudice of reducing the weight of preservative used can be overcome.

Hydrocyanic Acid for Fumigation

SOME eighteen months ago we drew attention to the use of hydrocyanic acid gas for fumigation purposes. About that time a couple of fatalities due to the gas occurred in this country even though the most elaborate precautions were observed. We remember, however, remarking that as experience was gained the new method would undoubtedly become increasingly safe, and that its application would scarcely be likely to be impeded by the untoward results of the early trials. It has not, apparently, taken long for those investigating the matter to light upon a process with which there is little or no fear of accident. The Chemical Warfare Service of America is responsible for the new process, and this body, in its attempt to unravel the problem, first experimented with chloracetophenone. This was found to give ample warning, but it was so persistent as to cause delay in returning ships to duty. Attempts were then made to use cyanogen chloride which, even though it is poisonous, produces lachrymation when the concentration of the gas is only some ten per cent. of that which is dangerous to human life. It is non-persistent, but the lachrymatory effect continues sufficiently long after the concentration has ceased to be dangerous, so that fumigation with a mixture of these two gases can be accomplished with little danger to the personnel. A process for producing the mixture of hydrocyanic acid gas and cyanogen chloride on board ship has been perfected, and this method of fumigation has been adopted by the Public Health Service of America. Those who are interested in the use and generation of this mixture will find a good deal of interest in recent particulars which have been issued by the Public Health Department at Washington.

A Question of Purity

IT has been said that in the purchase of no other commodity offered on the market to-day is the consumer more dependent upon chemistry to protect him against fraud than in the buying of fertilisers. No one, perhaps, would be prepared to dispute the fact that at one time relatively large quantities of more or less valueless materials were sold (but not necessarily in this country alone) at a high price on the basis of an attractive name, "a rich colour, and a strong disagreeable odour," designed to give the impression that the product offered had peculiar properties or some mysterious crop-yielding powers. Judging from some remarks we once recollect seeing in the journal of the American Chemical Society the farmers and other consumers in that country seem at one time to have paid the price for their chemical ignorance, and we have even come across producers over here who have told of convenient lots of such things as plaster of Paris which middlemen have inserted in their packing bags. If, however, such dodges were possible a couple of decades ago the consumer was most to blame for his inherent indifference towards anything or anybody to do with chemistry. Albeit, the day has gone when monkey-tricks of the kind can be practised without fear of detection, and the omnipresence of the chemist has been mainly responsible for trading practices which are quite above suspicion. We mention the point for the reason that only some few days ago we were questioned by a large consumer as to what guarantee he had that his purchases were up to standard or up to sample. Apart from the obvious retort that his protection lay in the employment of a chemist to keep an eye on things we had no hesitation in telling him that whatever may have been the practice in a few isolated instances in the past, the chemical merchant to-day is as proud of his integrity as of the purity of his products, and he would be unlikely to trouble his head about the rather childish, and eventually unprofitable, practice of adulteration.

Empire Exhibition Numbers

THE next three issues of THE CHEMICAL AGE will be special numbers dealing with the chemical exhibits at the British Empire Exhibition, which is due to be opened on Wednesday, April 23. The chemical exhibition will demonstrate, on a scale never attempted before, the range and resources of British chemical industry, and an effort will be made, by means of illustrations and letterpress, to give readers, especially those residing overseas, some idea of where the industry stands to-day and the great strides made in recent years.

Points from Our News Pages

Mr. F. J. C. China described some industrial applications of the "Premier" mill at a chemical engineering conference in Birmingham last week (p. 374.)

Dr. E. F. Armstrong gives his opinions on the formation of a scheme for Chemistry House (p. 377.)

The report of the annual meeting of the British Dyestuffs Corporation, which is published in full, reviews the present position of the Corporation (p. 379.)

The Institute of Chemistry have issued a memorandum on the present position of the British dyestuffs industry (p. 382.)

The improvement noted last week in the Scottish chemical market has not been maintained (p. 395.)

According to our London market report, a little more active. (p. 392.)

The Calendar

Apl.		
12	Mining Institute of Scotland: Annual Meeting.	Glasgow.
14	Faraday Society: Report on the Examination of Oppau Ammonium Sulphate-Nitrate. 8 p.m.	Burlington House, Piccadilly, London
14	Chemical Industry Club: Discussion on the subject of the Establishment of Chemistry House, 8 p.m.	2, Whitehall Court, London, S.W.1
15	Hull Chemical and Engineering Society: Annual General Meeting. 7.45 p.m.	Hull Photographic Society's Rooms, Grey Street, Hull.
16	Society of Glass Technology: Annual General Meeting.	Sheffield.
16	Society of Chemical Industry (Newcastle Section). Joint Meeting with the Coke Oven Managers' Association (Northern Section): "Coal Washing at Oughterside." J. G. Scoular and Basil Dunglinson. 7 p.m.	Armstrong College, Newcastle-on-Tyne.
18	Society of Dyers and Colourists (Manchester Section): "The Identification of Insoluble Azo Colours on the Fibre and of Azo Pigments in Substance." Dr. F. M. Rowe and Miss Clara Levin.	Manchester.

Industrial Uses of Disintegrating Mills

Chemical Engineering Conference at Birmingham

At a joint meeting of the Birmingham Section and the Chemical Engineering Group of the Society of Chemical Industry on Friday, April 4, held in Birmingham, a paper was read on "The Premier and other Disintegrating Mills and their Applications in Industry," by Mr. F. J. C. China.

In opening, the lecturer said that most of the recent attempts of obtaining very fine grinding of solid particles have had as their basis the utilisation of hydraulic forces. In other words, an attempt has been made to create enormous frictional resistance in a liquid in which is suspended the material required to be disintegrated. The resistance to disruption offered by a liquid subjected to rapid beating or shearing varies as the speed of attack, and up to the present time it has not been possible to obtain sufficiently powerful hydraulic forces to ensure disintegration of really hard material.

The Premier Mill

The two chief types of mill which have been developed during the last few years are :—(1) the beater type, (2) the type in which a film of liquid is subjected to a shearing action at very high speed. The beater type of mill has had a certain amount of success, but has limitations which need not be discussed here as we are mainly concerned with mills of the latter type. The Premier Mill, which falls under the second heading, is typical of this kind of machine and was described

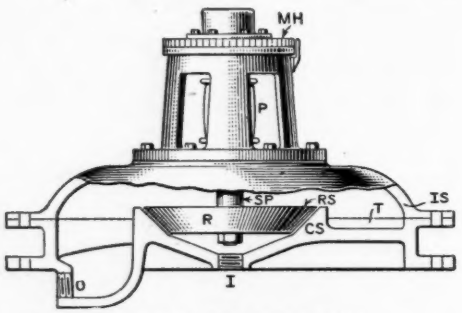


Diagram of the Premier Mill.

in detail, as the author had had more experience of its working than of other similar mills. It consists of a cone which rotates in very close proximity to a conical seating and a glance at the diagram will show its general form.

The mill consists of an outer casing which surrounds the rotor R. This rotor consists of a perfectly smooth steel cone which is made to extremely fine limits as regards accuracy, and fixed to the spindle SP, which is mounted in special bearings. This cone works in close relation to a fixed surface, CS, which forms part of the casing, the arrangement being very similar to the action of the clutch on a motor car, except that the two surfaces do not touch. The working surface of the rotor RS is arranged so that there is a very fine clearance between same and the surface of the casing CS.

With this arrangement there is, therefore, a metal surface rotating in very close proximity to a fixed surface at a speed which may vary between 1,000 and 5,000 revolutions per minute. The rotor is driven by the pulley P mounted on the spindle, SP. The bearings which control this spindle are mounted in the micrometer head MH, and in the top casing of the machine immediately below the pulley P. The micrometer head enables the clearance between the rotor RS and the cone CS to be adjusted to any degree desired.

The rotor should never be adjusted so that it actually touches the casing, but it can be so regulated that the actual clearance can be anything from three-thousandths of an inch to two or three hundredths, according to the nature of the work to be done.

When operating the mill, the material to be dealt with is fed through the inlet I at a suitable rate, either by pump or gravitation. Very little head is required when feeding under the latter condition, because the rotor acts as a centrifugal pump to a large extent, and assists by drawing the material to be dealt with between the working surfaces. It then passes through the narrow space between the conical surfaces in a fine film and, owing to the enormous speed of the rotor, the particles of soilds suspended in the film are rapidly torn apart.

Some typical applications of this type of mill are as follows :

(i.) The perfect emulsification of liquids.

(ii.) The intensive mixing of liquids and solids and the blending of difficultly miscible constituents in various chemical preparations.

(iii.) The minute disintegration of solids suspended in liquids.

(iv.) The extraction of oils, *e.g.*, the extraction of tar acids from tar oil, pyridine from tar oil, etc.

(v.) The extraction of fibrous tissues, *e.g.*, complete extraction of meat tissues in the cold, and the extraction of vegetable or animal fibres of any nature.

(vi.) The rapid and economical manufacture of paints and enamels and liquid suspensions of all kinds of pigments.

(vii.) The regeneration of milk from milk powders, and the production of synthetic cream from butter and milk powder.

(viii.) The rendering of certain metallic ores into a flocculent suspension.

(ix.) The wet grinding of organic chemicals, dyestuffs, etc.

(x.) The manufacture of tannin extracts.

(xi.) The manufacture of pharmaceutical mixtures and emulsions of all kinds.

Emulsification

Mr. China then passed on to deal with some of the above applications in detail. Referring first to emulsification of liquids he said that one of the first successful applications of the Premier Mill to an industrial emulsion process was that of impregnating timber with an emulsion of creosote oil in place of using neat creosote. Considerable work has been done on creosote emulsion with a view to impregnating wood with creosote in a dilute form, but so far as is known no emulsion has yet been prepared which will fulfil the following conditions:

(1) The emulsion must be so stable that it may be boiled or frozen without breaking down.

(2) The degree of dispersion of the emulsion must be so fine that no filtration takes place when the emulsion is forced into the pores of the wood.

(3) The emulsion when made must contain so small a quantity of added bodies that these bodies do not have a tendency to leave the creosote in the wood in such a state that it can be partially washed out by water. That is to say, that the insoluble properties of the creosote must in no way be impaired.

(4) The emulsion must remain so stable during the process of impregnating the timber that the unused portion of the emulsion must retain its original composition.

(5) The emulsion as made must contain so small a quantity of added bodies that it is commercially practicable.

There are many substances which will preserve timber, and each one has its advantages and disadvantages, but creosote, which has been in use for over seventy years, still holds premier place as a preservative, although many attempts have been made to supersede it.

It is, however, relatively costly on account of its scarcity, and also because of the fact that in order to secure the required penetration of the oil into the timber, it is necessary to leave the wood loaded with much more preservative than is essential to prevent decay. If creosote could be diluted with an inert substance to three or four times its volume, the same penetration of oil into the wood as given by the ordinary processes could be obtained, and yet have only $\frac{1}{3}$ or $\frac{1}{4}$ the amount of oil left on the fibres after the process is finished.

Water is the cheapest diluent which could possibly be used, and has the additional advantage that it can be left to season out of the wood of its own accord after impregnation. With the aid of the Premier type of colloid mill, and a carefully selected stabiliser creosote has been successfully obtained in an exceedingly fine state of subdivision in water, and these small particles prevented from again coalescing, even when the temperature is raised to somewhere near boiling point.

This emulsion has been given the name of "Plexosote," and by its means it is claimed that one can obtain the same results both as regards penetration and preservation as can be obtained by any known process of creosoting, but with considerably less oil and at a lower cost.

Another commercial application of an emulsion is that of an emulsion of bitumen and water. A soft bitumen can readily be emulsified in the Premier Mill with the aid of a suitable stabiliser, in which form it exists as a chocolate brown liquid which is miscible with water. This liquid can be readily sprayed on to the roads cold. On coming in contact with the stone, the emulsion breaks down and the water very quickly leaves the emulsion, leaving behind the bitumen coating. In practice, the road is sprayed in the ordinary way, and sprinkled with grit or dust in exactly the same way as it would be in the case of tar or soft bitumen.

Extensive tests are being carried out this summer with this material, and it is confidently anticipated that it will give satisfactory results. One can readily see that there will be considerable saving in labour, as no heating apparatus is required in the spraying, and no drying plant is required in the coating of the stone.

A somewhat extraordinary application of an emulsion process is that of emulsifying petrol. In utilising an emulsion of petrol and water in an internal combustion engine, one is forced to utilise a stabiliser which is completely combustible and one has very little choice but to accept ammonium oleate for this purpose. An emulsion of 30 per cent. of water in petrol is really quite a good fuel, and during this year a Chevrolet four-cylinder car has been run many hundreds of miles on it. With the engine kept sufficiently warm it was found that the same miles per gallon could be obtained with a 30 per cent. water emulsion as could be obtained with neat petrol, but there are other factors which must be considered before one can draw any conclusions from the above statement

Comminution of Solids

Regarding the minute disintegration of solids there is a limit here to certain degrees of hardness because one can only break up particles with the disintegrating forces which exist within the film of liquid, and these forces are naturally controlled by the thickness of the film and by the peripheral speed of the mill. The practical limit in the first case is about three-thousandths of an inch, and this limit is controlled by the limits of accuracy with which the machine can be made and by the slight wear which is likely to take place in the bearings, but more particularly by the distortion of the castings.

Experience shows that one can never predict with certainty whether a certain solid substance can be satisfactorily dealt with as far as fine disintegration is concerned, and the ordinary scale of hardness is a very little guide.

A material like sulphur which is fairly soft can be disintegrated to a stage where it will pass through an ordinary filter paper. In most cases where one is attempting to obtain a very fine suspension of a solid matter it is necessary to prevent flocking by the addition of some protective colloid, and the nature of this material varies according to the material used. In the case of sulphur a protective in the nature of a gum or glue is found to be very satisfactory, but for some purposes an inert protective such as magnesium hydroxide gel may be used with advantage.

Sulphur in a finely divided state is finding an increasing market as an insecticide, as a constituent of sheep dips, as a material to replace flowers of sulphur in sulphur soaps, and is a means of obtaining a colloidal sulphur bath in the home. A good deal of competition is going on in America between people who are making such sulphur mechanically and others who are making a similar product chemically.

Many organic chemicals which are extremely difficult to grind owing to their greasy nature may be very simply treated in the Premier Mill. There is another class of bodies which is almost impossible to grind owing to the difficulty of wetting with water. Certain dyestuffs in the dry form have been submitted to the writer which could not be wetted after stirring for a very considerable time; in fact, if one attempted to stir them into water the agitation simply caused the dyestuff to float away as a dust. In such cases one can simply feed the powder and liquid into the mill direct when wetting can be obtained immediately. Considerable success has been obtained in the grinding of certain dyestuffs in water, and in some cases the resultant material has been a slimy paste. Even with dyestuffs one finds that one can never predict what success one is likely to have.

Miscellaneous Applications

The extraction of certain constituents from various liquid, can readily be carried out with the aid of the Premier Mills and as an example the extraction of tar acids from tar oil may be quoted. The caustic soda and tar oil are run simultaneously into the mill and the rates of flow adjusted by flow meters in order that the proper quantities are permitted to react. The reaction is instantaneous in the mill and the resultant product can then be run into the centre of a separating column filled with packing. The carbolate and cresylate sink to the bottom, while the washed oil floats to the top. Both products can then be run off simultaneously and continuously.

In the manufacture of paints and enamels the grinding capabilities of the mill limit its use to certain pigments, but it is found possible to manufacture a consderable number of these commercial paints and enamels with the use of the mill alone, without resorting to orthodox paint machinery in any form.

An extremely useful work which is perfectly carried out by means of the colloid mill is that of the regeneration of milk from milk powders and the production of synthetic cream from butter and milk powder. The use of this regenerated cream is slowly growing in this country. In the United States of America enormous quantities are used, and the Premier Mill finds a ready market in that country for the homogenisation of ice cream paste and the production of synthetic cream.

The study of the control of emulsions is receiving considerable attention from those interested in this particular mill, and it is hoped shortly to be able to guarantee the stability of almost any emulsion for an indefinite period, but to this end chemists will realise that stabilisers must be found that do not decompose in dilute solution. It is well known, of course, that the stability of an emulsion or a suspension depends entirely on certain electrical factors, and the problem is entirely a physico-chemical one. The state of this research at the present time is such that it indicates that the control of an emulsion will be carried out almost entirely by the accurate adjustment of the hydrogen ion concentration of the medium.

Discussion on the Paper

Dr. Maxted, who presided, said it was astonishing to him that such disintegrating machinery had not been invented before, and added that it would be interesting to know more precisely the degree of disintegration they were getting down to with solid bodies. He thought progress might be made in the domain of liquid fuel. In many directions there appeared to be much scope for these colloid mills.

Professor J. W. Hinchley said the subject of the colloid mill was of great interest, and was another example of a fact which was common that a person who was comparatively ignorant of the difficulties proceeded to invent something which the men who knew the industry well had not the courage to do. He regarded the method of impregnating timber with an emulsion of creosote oil as a valuable contribution to industry, and the only question was whether the contractors would accept a modified specification because as a rule contractors insisted that there should be a definite poundage of creosote.

Mr. Barnes (Manchester) said the industrial importance of the subject could hardly be exaggerated, and his only regret personally was that Mr. China had confined his remarks largely to one type of mill; he would have welcomed comparisons between the working of that particular mill and others on the market for the same purpose. His own impression of these high-speed mills was their great use, from an economic point of view, when dealing with materials ground in water. He had always found in grinding that the thinner the liquid in which the pigment or other articles were the more easy it was for the men to carry out their duties.

Dr. Parker (Gas Research Department, Leeds University), alluding to the reference that attempts were being made to utilise a suspension of iron oxide in the purification of gas, and to the statement that difficulties had arisen in the re-oxidation of the material after the gas had been purified, he observed that if there were any likelihood of this method having

chance of success on economic grounds means would be taken to revivify the oxide at a cheap rate. The mill worked at fine limits, and in the case of iron oxide there must be a certain amount of foreign matter which was easily broken up. Information as to the wear and tear on the face of the rotor and the casing when working such material, containing siliceous matter, would be of interest.

Dr. Twiss (Dunlop Rubber Co.) expressed disappointment that no mention was made of the production of very fine powders. In evaporation methods to obtain these, coarseness often followed.

Mr. Knapp (Messrs. Cadbury's, Ltd.) referred to the question of the regeneration of milk from milk powders, by means of the mill, and inquired if the Health Authorities would accept such as fresh milk.

Mr. China replied on the points raised, and the members warmly thanked him for his contribution.

Valuable Thio Anilines

Interesting Compounds Described by Dr. H. H. Hodgson

DR. H. H. HODGSON, in a lecture before the West Riding Section of the Society of Dyers and Colourists in Bradford, on Thursday, April 3, gave particulars of some valuable results obtained by a continuation of the work carried on by him at the Bradford Technical College in 1911, which aroused great interest at that time. The present investigations are being carried out by Dr. Hodgson as head of the Department of Colour Chemistry at the Huddersfield Technical College. Mr. H. Jennings presided over the meeting, and the title of the paper was "The Thionation of Aniline."

Dr. Hodgson said that this subject was one which had occupied almost the whole of his research life. In 1905 he carried out certain preliminary investigations. Later, at Zurich, in endeavouring to prepare dithioaniline, a rash developed on his hands in working with the compound. The rash was cured in a fortnight, since when he had been able to work with the compounds with immunity. He had to abandon the work at that time, but he took it up again at the Bradford Technical College, and obtained certain results. A statement by the then Chairman of the Technical College Committee, which claimed a greater value for the work than he himself claimed, led to a large amount of publicity being given to the research.

During the war he came in contact with a surgeon in London, who invited his collaboration in producing salvarsan It struck him that the composition of salvarsan was very similar to the thio bodies on which he had been working for so long, except that sulphur replaced arsenic. The arsenic constitution of salvarsan was not without its dangers, and in certain circumstances toxic effects had been found. The thio bodies he had evolved, while avoiding toxic difficulties, were more effective in their operation, judged by the current medical theory.

Curative and Prophylactic Properties

He handed over specimens of the thio bodies to the surgeon, and was then called away to the more prosaic business of making fuming sulphuric acid. The gentleman with whom he had collaborated continued his experiments, and subsequently claimed to have obtained valuable results, not only in syphilis, but in cases of chronic rheumatism, boils, carbuncles, very acute cases of dermatitis, and even tuberculosis. He had used the original bodies which had been given to him, but the research had now been carried further at Huddersfield, and experiments were being made with the later products, the results of which he hoped to publish in due course.

A friend of his, after having suffered from the same rash that he had had in Zurich while working on the compounds, went to the Nile Delta, where everyone got a certain fever except his friend. Subsequently he went to India, and was some considerable time before he contracted malaria, and then it was only a very mild attack. Packages of the thio bodies were now on their way to India, where they were being applied to various plagues, foot-and-mouth disease, and so on, and he hoped to hear results very shortly. Experiments were also being conducted in this country, and he had great faith in the future of the substance.

An interesting discussion took place, at the close of which a vote of thanks was accorded to Dr. Hodgson on the motion of Mr. Ernest Hickson, seconded by Mr. A. E. Smith.

The Late Sir James Dewar

Professor Armstrong's Lecture before the Society of Chemical Industry

THE April meeting of the London Section of the Society of Chemical Industry was held on Monday in the Lecture Room of the Royal Institution, Albemarle Street, London, when Professor H. E. Armstrong, F.R.S., gave a lecture, with demonstrations, on "Sir James Dewar as an Experimental Inquirer." Dr. Bernard Dyer, Chairman of the Section, presided.

In our issue for January 26, p. 95, we gave a report of a Friday Evening Discourse given by Professor Armstrong on the work of the late Sir James Dewar, and the present one followed similar lines, although it was supplementary and contained fewer personal details than did the Royal Institution lecture. Many experiments were carried out with liquid air, etc., with apparatus which Dewar used, and again Professor Armstrong emphasised the point that Dewar was not a mere skilful manipulator but was a chemist in the full meaning of the word, with a mathematical outlook and a Bohemian desire to wander into regions yet untrod. He was, indeed, a chemical explorer without a desire to get public applause, and whose work was characterised by one great quality, now becoming rare, viz., complete honesty of purpose.

During the course of his demonstrations Professor Armstrong showed some of the effects to be obtained with liquid air and charcoal and of the change in specific heats of various metals at ordinary temperatures and the change that takes place at the temperature of liquid air, or the lower temperature of liquid hydrogen. Another experiment was to demonstrate the powerful magnetic properties of oxygen. Apparently noticing a lack of applause, Professor Armstrong remarked that there is no enthusiasm about these things to-day; we have grown too accustomed to them.

Experiments on Combustion

Combustion experiments were then dealt with and the production of ozone, on one case by burning a Nernst filament in liquid air, the point being made that Dewar discovered that oxygen gives rise to ozone whether a substance was burned in liquid air, as in the case of the Nernst filament, or whether it was heated and simultaneously exposed to ultra-violet light. Commenting on this, Professor Armstrong asked how it was possible to explain the production of ozone in all these cases. When he was young, the usual method was simply to write $O_2=O+O$; $3O=O_3$. That was all very well when he began to study chemistry, but unfortunately people had not got any farther since. In his opinion there was not the least doubt that peroxides were formed and that these peroxides broke up and gave rise to ozone. This breaking up, however, was a more complicated process than a mere breaking up and he urged chemists to think more about things that went on and not to take so much for granted, as seemed too often to be the case.

A number of demonstrations were then made of luminous phenomena, associated with Dewar, and Professor Armstrong suggested that many of the effects which he had shown were electric discharge effects. In this connection, reference was made to the "ice-pail" and a demonstration was carried out by Mr. G. L. Addenbrooke to show that the "ice-pail" does not behave in the way that the text books all say it does, but that the charge resides mostly on the surface, the energy being dissipated according to the amount of water present. Mr. Rollo Appleyard then conducted an experiment to which Professor Armstrong said he wished specially to call the attention of chemists, viz., the relation which exists between an electrolyte and electrodes, and again Professor Armstrong made the point that many of the effects which he had demonstrated were purely electrolytic effects due to electrolytic polarisation within the dielectric, caused by an infinitely great series of minute couples within the material.

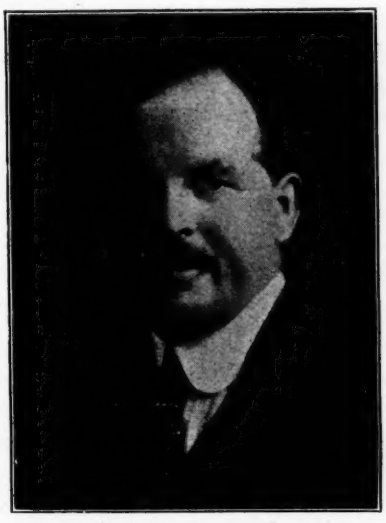
Finally, there were references to Sir James Dewar's work on soap films and the work of Professor Bragg upon X-rays analysis, which, however, said Professor Armstrong, only dealt with the centres of molecules. He himself, however, would present a carbon atom not as a mere centre but clothed and in its right mind. Models were shown illustrating the point, paraffin or diamond carbon atoms being shown and also ethinoid carbon atoms. Reference was next made to graphite, a substance with which Sir James Dewar worked, and a model was shown for this also, which, it was claimed, could be accepted by chemists.

Chemistry House: A Chat with Dr. E. F. Armstrong

Practical Politics or Distant Ideals

WHILE many minds interested in the idea of a Central Headquarters for British Chemistry are searching for the ultimately perfect plan, a whisper reached us the other day that an immediately practical turn had been given to the movement by Dr. E. F. Armstrong, F.R.S., the President of the Society of Chemical Industry, and an inquiry addressed to Dr. Armstrong confirmed the report that he is well advanced with the details of a less ambitious but almost immediately practical scheme. Dr. Armstrong is approaching the close of his second year of office, and there is a hope in many quarters that before he vacates the chair the matter may have passed from the realm of discussion to that of action. His views, as will be seen from what follows, are of the concrete rather than of the visionary type, and are concerned more with finding an immediate and practical starting point than in discovering the perfect plan which may be realised in another century. In reply to an inquiry as to the present position of affairs Dr. Armstrong discussed the situation quite frankly.

" I have long felt it desirable," he said, " that something definite should be done. The large scheme to provide both a headquarters for the societies and a lecture theatre, together with club premises, which we are tending to associate with the name of the late Lord Moulton, is to-day obviously impracticable, though we must retain it in our memories as an ideal we shall not cease to try to attain. Many of us in discussing the subject consider the time is ripe to attain a half-way object, which I may more clearly define as the provision of a headquarters for the societies. I have, therefore, worked out, with the assistance of my friends, particularly of Dr. Longstaff, a definite scheme. This has been put in a tentative way before prominent men in the societies interested and representatives of the Chemical Industry Club. Two meetings have been held recently, both of which were unanimously in favour of the scheme receiving further consideration, and it has, therefore, been officially brought to the notice of the Federal Council which now has it under consideration. It is, therefore, possible for me now to give you details of it so that the largest possible number of chemists may give it their consideration.



DR. E. F. ARMSTRONG, F.R.S.

Suitable Quarters Available

" We have found what we consider entirely suitable quarters quite close to Victoria Station, which are therefore within easy reach both of the Club at Whitehall Court and of the Chemical Society at Burlington House. We have inquired from the various societies the amount of accommodation they require, and it has been possible so to allot the rooms in the new house that space is left over after all their demands have been satisfied. The allocation includes a reading and writing room for visitors, as it is presumed that Chemistry House will be more and more the meeting place for chemists during working hours. It also includes three large committee rooms, and in this connection I would emphasise the enormous amount of time which would be saved by having all the chemical committees under one roof. A little organisation will enable those of us who are members of very many committees to attend at least twice as many as we can at present, and eliminate the unnecessary travelling about London. It is not proposed to serve any food in the new premises, and it would therefore in no way compete with the Club. It is, perhaps, unfortunate that suitable large lecture rooms are not available, but this in itself cannot be enough to condemn the idea.

" I may say that it is hoped the scheme would embrace in the near future the Chemical Society, the Society of Chemical Industry, the Institution of Chemical Engineers, the Association of British Chemical Manufacturers, and that the smaller chemical societies which have no permanent offices would also find a home there. The ultimate bigger scheme must undoubtedly also include the Institute of Chemistry."

Finance

" What about the finance of your scheme ? " Dr. Armstrong was asked.

" It will be necessary," he replied at once, " to provide a capital sum to purchase the remainder of the lease of the house selected and to do certain necessary furnishings. I estimate that the sum of £30,000 would be sufficient, and that it would be possible to raise this money within a year by donations from those interested in the scheme. There would, therefore, be no burden of interest on capital account. On the other hand, we should have to raise an annual sum to pay for rates, taxes, light and heating, general furnishing and upkeep, as well as to provide a sinking fund to replace the original capital at the expiraton of the lease of the house. This is not ithe moment to give details on this point, but the total charge would not in my opinion be excessive. We must, however, not disguise the fact that the acquisition of any property in Central London to-day is a costly project, and likely to grow even more costly year by year."

Advantages of the Scheme

" What do you consider to be the special advantages of your scheme ? "

" I hold very strongly that an immediately practical scheme does not prejudice any future larger scheme, and that it would supply useful experience. At the start it is confined simply to housing the staffs of the various societies without raising complicated details of amalgamation, though we all feel very strongly that close association of the various societies must facilitate co-operation. The convenience of having everybody, and all committee meetings, etc., in one building makes the idea of a central headquarters operative on a limited practicable scale, which is surely better than discussing castles in the air.

" I should perhaps add that the provision of offices for the new Bureau of Abstracts is a very pressing matter, and that from the point of view of this alone Chemistry House is wanted at once.

A Decision For or Against

" Then one gathers that what you now want is a decision for or against a scheme of the type you outline ? "

" Yes, certainly. If we go on talking as we have done for the past year or so nothing will ever be done, and every year golden opportunities are slipping past us. I hope the Federal Council will immediately have the courage to pronounce in favour of the scheme, and ask each society to appoint a representative with a mandate to bring it into being.

" I notice a regrettable tendency to fritter valuable time away on the discussion of minor details, and I further think it regrettable that the mere whisper of a definite scheme should be bringing all sorts of other more or less utopian proposals to the fore, including the provision of separate chemistry houses in the provinces. We want assistance, not criticism and obstruction."

The Question of Management

" Have you any ideas as to the body in whom you should vest the management of the new House, which presumably will have to be some sort of a trust ? "

" My idea on this subject is that Chemistry House should be managed by a board of directors or trustees with an active chairman or managing director. Each society would appoint a director for a period of years. All funds subscribed to

Chemistry House, and all future funds subscribed towards an extended scheme, including legacies, would be vested in and managed by this board, and the income devoted either to the upkeep of Chemistry House or added to the capital sum. It would be desirable as far as possible ultimately to make only nominal charges for rent to the societies using the House, but during the first year or two this would not be possible. The details of this part of the subject have still to be thrashed out in committee."

"Having arrived at the total annual cost for the period of the lease, would this sum distributed among the tenant societies add to or diminish their existing costs?"

"That is a difficult question to answer immediately. The only case where the cost might in the first place be seriously greater would appear to be the Chemical Society, who at present have the advantage of living rent free. I feel, however, that this question is not one which is ripe for public discussion.

"Speaking generally I will add, having examined this scheme from all angles for a considerable period, that I am satisfied that it contains the nucleus and the only practical realisation of co-operation at the moment. The larger schemes, such as that which has just been put forward by Mr. Marlow, though good in theory, are not such as we can realise in this generation. I am, however, not interested in criticising other schemes but in trying to find out whether chemists want a Chemistry House this year."

Society of Glass Technology

Duplication of the Portland Vase

THE President (Professor W. E. S. Turner) presided at the meeting of the Society of Glass Technology, held in Stourbridge on March 19.

The first paper dealt with the "Properties of lead-containing glasses." Professor Turner, who communicated this, described the special properties of the alkali-lead oxide glasses, with particular reference to their thermal expansion, chemical durability, and electrical properties.

Mr. J. Northwood followed with a paper on "The Art of British Glass Decorators—The Duplication of the Portland Vase." The Portland Vase, he said, was regarded as the greatest achievement of the ancient glass makers. Up to the time when Josiah Wedgwood borrowed it from the Duke of Portland for the purpose of imitating it in his jasper ware, it was thought to be stone or earthenware, owing to its dull appearance. The vase is composed of two glasses, the inner body or groundwork being of a very dark blue transparent glass, and the outer casing of white opal glass out of which the ornament and figures are sculptured. This decoration stands up in relief from the blue ground. The reproduction of the Portland Vase was accomplished by the late Mr. John Northwood, with the aid of his relative, Mr. Philip Pargeter. The casing of the blue body with a uniform outer layer of opaque white was considered at that time as a matter requiring great skill on the part of the glass maker. It was believed that the actual maker of the glass used in this English Portland Vase was Daniel Hancock of Wordsley.

Several blanks were selected, and one was found sufficiently good to be taken in hand in 1873, and carried through to completion. The exterior opaque white was slightly acidised by hydrofluoric acid, and the design drawn upon it. Then commenced the hard labour of removing the surplus white glass from round the figures and design, right down to the blue body ground. Extreme care and patience were necessary to chisel out, without mishap, the delicate details of the human form in order to create a true reproduction. Hence, small carving tools were indispensable. As the work progressed through the three years of labour it entailed, Mr. Northwood was allowed by the authorities of the British Museum to take his work and place it beside the original for comparison. The vase was very nearly completed when it suddenly cracked, owing probably to a difference in co-efficients of expansion of the two glasses. Still, the artist was not discouraged, and in 1876 the work was completed. The vase, said Mr. Northwood, was now in the collection of Mr. P. Pargeter, of Stourbridge. It had been suggested that this work should come into National keeping.

The next meeting of the Society will be the annual general meeting in Sheffield, on April 16.

Society of Public Analysts

AT the ordinary meeting, held at the Chemical Society's Rooms, Burlington House, on Wednesday, April 2 (Mr. G. Rudd Thompson, president, in the chair), certificates were read for the first time in favour of Messrs. G. W. Clough, D.Sc. (Birmingham), J. P. Shenton, F.I.C., and W. S. Wood. Certificates were read for the second time in favour of Messrs. J. J. Bryant, F.C.S., E. W. Deag, H. W. Hewis, B.Sc. (Lond.), A.I.C., E. W. Jackson, F.I.C., T. McGrath, and A. Scholes, F.I.C.

The following were elected members of the Society:—Messrs. P. W. Alloway, L. O. Brekke, B.Sc. (Leeds), A.I.C., A. M. Cameron, B.Sc., F.I.C., T. W. Drinkwater, L.R.C.P., L.R.C.S. (Edin.), F.I.C., J. R. Furlong, Ph.D. (Wurzburg), A.I.C., E. Griffiths-Jones, M.Sc. (Manchester), A.I.C., B. G. McLellan, F.I.C., and W. T. Rigby, F.I.C.

Abstracts of Papers

In a report on the World's Dairy Congress, held at Washington, by John Golding, D.S.O., F.I.C., a brief account was given of visits to laboratories, universities, etc., in New York, Washington, Ithaca, Guelph, etc. Reference was made to a series of papers communicated at the meetings at Syracuse on recent discoveries in the newer problems of nutrition. Among these was mentioned papers on the dietary factor essential for reproduction by H. M. Evans; causes of vitamin variation in milk, Kennedy and Dutcher, etc.; value of milk as a cure for deficiency diseases, E. V. McCollum and La Fayette B. Mendel and H. C. Sherman; vitamins and calcium balance in cows, E. B. Forbes and E. B. Meigs. Other subjects include the use of milk in bread-making and the necessity for legislative control.

"The Routine Examination of Dairy Products with Special Reference to the Mojonnier Tester," was dealt with in a contribution by L. H. Lampitt, D.Sc., F.I.C., E. B. Hughes, B.Sc., F.I.C., M. Bogod, B.Sc., A.I.C. The Mojonnier tester, it was explained, for the determination of total solids of milk, consisted of a hot plate on which the milk was evaporated in an aluminium dish, and an electrically heated and thermostatically controlled vacuum in which drying was completed, the dish being cooled off in a water-cooled desiccator. The time for a complete determination of total solids in milk was 21 minutes. The Mojonnier method for the determination of fat was a modified Röse-Gottlieb method. The extraction was carried out in a specially shaped flask, which could be shaken vigorously after the addition of each reagent, and then centrifuged. The ethereal layer was decanted into an aluminium dish, evaporated on a hot plate, dried in a vacuum oven, and cooled in the desiccator. The time for a complete determination of fat was 30 minutes, or for total solids and fat together, 38 minutes. Typical results were shown for these determinations on various milk products. An application of the Gerber method to the determination of fat in milk powders was advocated.

In a paper on "Experiments on the Absorption of Copper following the Consumption of Vegetables containing Copper Sulphate," by J. C. Drummond, D.Sc., F.I.C., Miss M. G. Palmer, B.Sc., and Miss D. E. Wright, B.Sc., it was stated that metabolism experiments had been made on rats maintained on diets containing a high proportion of peas containing added copper. Close examination of the tissues at the end of the experiment showed no abnormality which could be attributed to the copper absorbed from the food.

"An Attempt to Extend Mitchell's Colorimetric Method to the Catechol Tannins," was described by Phyllis Honor Price, B.Sc. (work done under the Analytical Research Scheme). Mitchell's ferrous tartrate reagent, it was stated, could be used for the colorimetric comparison of (1) catechol with catechol; (2) protocatechuic acid with protocatechuic acid; and (3) catechin with catechin, but the method did not give satisfactory results for the comparison of these substances with one another. The ratio between the colorimetric results was not a molecular one, as observed by Mitchell in the case of pyrogallol and gallic acid, where the carboxyl group acted as a diluent. It was found that catechol tannins, unlike pyrogallol tannins, were precipitated by the combined action of the reagent and quinine hydrochloride or cinchonine sulphate, and this behaviour prohibited the application of the method to catechol tannins. A series of experiments had shown that in order to give the violet coloration with the reagent a substance must contain two hydroxyl groups in the *ortho* position.

Company Meeting.

Annual Meeting of British Dyestuffs Corporation

Negotiations with the I.G.: Fundamentals of the Agreement

Future Management of the Corporation

THE fifth annual general meeting of the shareholders of British Dyestuffs Corporation, Ltd., was held on Tuesday in Manchester, Sir William Alexander, K.B.E., M.P., chairman and managing director, presiding. Amongst those present were Sir Henry Birchenough, Bart., K.C.M.G., Mr. G. V. Clay, Mr. G. P. Norton, Professor W. H. Perkin, F.R.S., and Field-Marshal Sir W. R. Robertson, Bart., G.C.B., directors; Mr. W. E. Mortimer (Messrs. Slaughter and May, solicitors), Sir William McLintock, K.B.E. (Messrs. Thomson, McLintock and Co., auditors), and Mr. D. R. Mackay, secretary.

The Chairman, in moving the adoption of the report and accounts, dealt in detail with the balance-sheet, already circulated, and then proceeded: I now turn to the year's results as shown in the directors' report, from which you will see that, after providing £360,000 for depreciation and crediting the final amount recoverable in respect of our claims for refund of excess profits duty, there remains a profit of £251,000, as compared with £102,000 in the previous year, an increase of £150,000. This increase is due largely to improved trading results, the amount now taken into account for excess profits duty being considerably smaller than that credited in the preceding period. This result has been achieved notwithstanding a substantial fall in the price of dyestuffs and continued depression in the general world condition of trade, which has been especially acute in the textile industries, which are the largest consumers of our products. It is, however, some satisfaction to observe an improvement in demand which has been reflected in the sales of the corporation. The debit balance carried forward from previous years still remains to be made good, and, even after applying the profits now shown, there is a deficit of approximately £450,000. I will make further reference to this deficit when dealing with the reconstruction proposals.

Improved Trading Results

I have already mentioned that the improvement in trading results has been accomplished notwithstanding a fall in prices, and your attention is drawn in the directors' report to the surplus capacity of dyemaking plants throughout the world. On the present volume of trade the prices now obtainable for many important dyestuffs are barely remunerative, and no marked improvement in results can be looked for until the conditions of the world's trade justify a much larger output of colours. I hesitate, therefore, to attempt a forecast of what the trading results will be for the current year; but, so far as returns to date are an indication, I think we may anticipate a result no less satisfactory than the figures now before you.

During the past few weeks the policy of the corporation in regard to research has been subjected to criticism both in the Press and elsewhere, and, in order to correct misapprehensions which appear to have arisen, I desire to state most emphatically that your directors are unanimously of opinion that original research work must be continued and developed on an adequate scale by the corporation. They hold the view that expenditure of this nature is a sound business proposition from which material benefit will be derived in future years. The amount of money which can be spent in this direction, however, must be finally determined by the resources which the corporation can set aside for this purpose. Research work in the past has been devoted largely to ascertaining the constitution of colours hitherto manufactured only by foreign makers. Good progress has been made in this direction, and it may be said that the scientific basis of practically all the well-known dyestuffs has been established on a laboratory scale. The necessity for such investigations will decrease continuously as the existing gaps in the general range of dyestuffs are filled up, and consequently our research staff will be able, as time goes on, to devote more and more attention to original research in place of the imitative research which has been so necessary in the past.

With this object in view a reorganisation of the personnel of the research department has been effected by Professor W. H. Perkin, F.R.S., who, with the assistance of Professor Robinson, F.R.S., now supervises the work of this department. We have under his direction a body of experienced men, competent, we hope, in every way, to meet the requirements of the industry, and capable of expansion in the future. The translation of the knowledge obtained by the research department into terms of works production calls not only for the development of manipulative skill in manufacture, but also demands in many cases the erection and equipment of special plants. As already intimated, expenditure in this direction will not be undertaken until your directors are satisfied that a reasonable return can be obtained on the capital expended.

Reconstruction of Capital

Your directors announced in November last that they had under consideration the question of reconstruction of capital. You will recollect that at the last ordinary general meeting I told you that we should not hesitate to come forward with our proposals when we considered the time to be ripe. In November, influenced to a large extent by the fact that the corporation had turned the corner and was earning profits, even under adverse conditions of trade, we thought such a time had arrived. After a very careful survey of the whole position, a provisional scheme was prepared which would write off entirely the preliminary expenses, goodwill, patents and other rights, the whole of the accumulated losses, and in addition provide a sum for writing down the fixed assets to a figure more commensurate with present-day replacement values for an equivalent volume of trade.

On further consideration your directors have come to the conclusion that it will be best to defer reconstruction until the position in relation to the German negotiations become clearer. I think I ought, however, even at this stage to advise shareholders that the scheme proposed is not of the usual type, and that whilst the proposals contemplate wiping out all non-tangible assets in order to strengthen the competitive position of the company, it is also hoped that something in the form of a return of cash to the preference shareholders may be possible.

The Negotiations with the I.G.

I now pass to a subject which has caused discussion and criticism in many quarters recently—namely, the negotiations which have been proceeding for the conclusion of a working arrangement between your corporation and the Association of Germany Dyestuffs Manufacturers, generally known as the Interessen Gemeinschaft, or I.G. At the ordinary general meeting held in 1922 I told you that informal negotiations between ourselves and the I.G. had been proceeding, and that whilst we would welcome an arrangement it must leave inviolate the principles upon which your undertaking was founded—namely, the establishment of a dyemaking industry in this country adequate to our needs both in peace and in war.

At that time the I.G. did not see their way clear to make or accept proposals consistent with this principle, chiefly, in my opinion, because they were not convinced that this country was really determined to maintain the Dyestuffs (Import Regulation) Act, and also because at that time they had not sufficient proof that we could manufacture quality for quality as regularly and as well as themselves. In this belief they were, I fancy, encouraged by the criticisms of various interests within our own borders. At the end of last year negotiations were reopened, and it was found possible to agree on certain heads which, if incorporated in a document in legal form, might form the basis of a contract which your directors could recommend their shareholders to accept.

During the extended negotiations modifications have been made from time to time in the form of the proposals, following suggestions which have been made to us and criticisms which have reached us from many directions. Much of the criticism, however, which has been levelled against the proposals lacks foundation, but this is not a reflection on the critics,

who only derived their knowledge from the incomplete details which appeared in some journals here and abroad.

I had hoped to-day to have entered upon the subject in some detail, but, owing to the public character of this undertaking, it is a matter of extreme difficulty. I would remind the shareholders that in a matter of such national and international importance as the conclusion of an agreement between your undertaking and the great German combine, the Government, under the articles of association, has the final and decisive voice. Until the Government has indicated at least its general approval of the lines on which we have proceeded, it is impossible to enter into details.

So far as interests outside this corporation are concerned, I think they may rely on careful consideration being given by the Government to any representations which may be made. In any event, the board would not venture to submit a scheme for the approval of shareholders which did not safeguard the interests of the undertaking both from a national and from a shareholder's point of view. So soon as there is anything to be said definitely as to the form which the proposed agreement may take, a special meeting of shareholders will be summoned if necessary.

A Reply to Criticisms

I would like to take the opportunity, however, to deal with some of the principal criticisms which have reached us mainly based, as I said, on incomplete information which has appeared in the Press. It is said that pressure would be exerted on the score of cost of production to concentrate production in Germany as far as possible with diminution of the output of the corporation's factories. We are sure that with our natural resources in raw materials, we should be able to manufacture with the assistance of the I.G. as cheaply and efficiently as they themselves, and the whole spirit of the negotiations is against any diminution in the output of the corporation's factories, and is even in favour of an increased production.

We have taken our stand on the principles enunciated two years ago with regard to the objects for which the corporation was formed, namely, to "concentrate, extend, and expedite the manufacture of synthetic dyestuffs and colours in this country." Any contract we enter into must contain the clearest declaration on this point. There are those who think that acceptance of the contract would curtail or eliminate research from our activities, since it may be cheaper and easier to take the results of research ready made from the I.G. I wish to declare categorically that there is not the slightest intention of diminishing the activities of our research department, and in the preamble to the agreement we propose to state that it is essential that research in organic chemistry and its application to industry must be continued and developed in this country. The establishment and development of the industry in this country is a fundamental condition of any arrangement. In the past the efforts of the research department have been mainly expended in improving existing processes, in cheapening costs, and in developing manufacturing recipes for dyestuffs already known to the I.G. Continuous pressure from consumers for lower prices and a wider range of dyestuffs has forced us in that direction, but with all further technical information readily forthcoming from the I.G. on dyestuffs which are already known, our research department should be free to enter upon entirely new fields of investigation. Our works chemists would have the freest access to German plants and methods.

There is one point upon which I should properly give some assurance to users. There was a fear that a contract might be concluded which would close the free access of dyestuffs consumers in this country to German sources of supply with the advantages which that access confers in the way of technical assistance in dyeing problems, information regarding new developments, and in other ways. The proposals, as originally drafted, provided that the I.G. should retire so far as selling is concerned from the British market. To meet the views of users the proposed arrangement has been modified to permit their obtaining German dyestuffs in any way they please, subject, of course, to any legislative restrictions. We hope, however, that so long as we supply dyestuffs of the highest quality and at competitive prices users will support us by obtaining their requirements from us.

Anticipated Benefits

We believe that, if we are able to bring our negotiations to a satisfactory conclusion, they will result in an expansion of our range of dyestuffs to a point where the quality, quantity, variety, and price would guarantee the British consumer all the security he could reasonably ask for. We are also of opinion that not only would the arrangement secure a national industry for peace-time requirements, but would provide the nation with an equipped and trained personnel as a most valuable contribution to our defences in time of peril. Increased output by securing a greater share of British and overseas requirements will mean more employment for workmen and chemists and a reasonable return on their investments to the shareholders who have invested capital, many from patriotic motives, in this young industry.

If your corporation had been an industrial undertaking of an ordinary nature your directors would only have had to deal with their shareholders, but, owing to its national aspect and the political atmosphere which surrounds its operations, the task is much more complicated. Your directors can only continue the negotiations under the conviction that the advantages to be obtained will outweigh all other considerations and will be satisfactory to the shareholders; and if, having met criticisms by logical and commonsense arguments, your directors are not encouraged to complete a working arrangement such as I have outlined, the responsibility for the future progress and prosperity of the corporation must rest on other shoulders.

Review of the Last Three Years

There remains a question of more or less personal character. It concerns the future management of the corporation. When I first met you after my appointment as chairman and managing director I announced that my tenure of office could only be temporary, and that I had no intention of retaining it permanently. I came into your corporation about three and a half years ago under very great pressure to deal with a critical condition in its affairs, and, having completed the special duties which I undertook, the time is now opportune for throwing the responsibilities on to the shoulders of those who will be called upon as permanent full-time officials to conduct the business.

As this is the last occasion on which I shall meet you as managing director I may be permitted to recapitulate very briefly what has been accomplished during the past three years on behalf of the board since I took over executive control of the undertaking. At that date the corporation had locked up in stocks a total value of nearly £4,000,000, from which more than £1,500,000 was subsequently required to be written off to reduce to current market values. To-day our stocks stand at £1,600,000. Cash on hand and readily realisable investments have been increased by more than £2,000,000. A total sum of £1,200,000 has been set aside for depreciation, and the plant has been kept in first-class order. Administration and establishment charges have been reduced by £250,000 per annum, notwithstanding the fact that the range of colours and production and sales have substantially increased. Manufacturing efficiencies have been improved and working costs reduced, enabling us to reduce the average selling price of our dyestuffs during this period from 48d. to 30d. per pound, a reduction of nearly 40 per cent.

It is gratifying to report in regard to quality that not only have the consumers in this country appreciated the improvement, but during our negotiations with the I.G. the I.G. themselves frankly acknowledged that the range of dyestuffs manufactured by us is of regular and standard quality, and this achievement on our part was no doubt one of the factors which induced them to discuss a working arrangement. A close co-ordination has been secured between the various branches of the corporation's activities, and, although I do not contend that mistakes have not been made in carrying out the policy which has been adopted, I think we are entitled to claim that this policy has laid a firm foundation on which our successors can confidently build.

Future Management

Our plans for future management are not yet finally settled, but I think you are entitled to have stated to you in broad outline how we propose to act. I have always held the view that whatever appointments may be made to assist in the development of this undertaking, it is to the men who are intimately associated with the business from day to day that we must ultimately look for success. My experience as managing director during the last three years has only served

to strengthen this view, and I have made it my business to encourage individual responsibility on the part of all heads of departments and to give them the fullest insight into the general financial and commercial conduct of the business. In August last I appointed an advisory committee, consisting of the principal heads of the departments, to assist me in carrying out my duties as managing director. This committee has met regularly and frequently under my chairmanship, and its appointment has proved highly satisfactory. I have every reason to believe that with such modification as experience may prove to be desirable it will function just as satisfactorily under whomsoever may be appointed ultimately as my successor as managing director. So far we have been unable to find a man whose qualifications and experience are such that we would feel justified in handing over to him the executive control of the business. I need hardly say that we are continuing to explore every avenue with a view to a suitable appointment, and, pending such appointment, it will be my duty as long as I remain chairman to see that the internal organisation which I have built up continues to function efficiently and that the interests of the corporation are protected.

Shareholders' Opinions

Sir Henry Birchenough seconded the adoption of the report and accounts.

Before putting the resolution to the meeting the chairman invited questions.

Mr. Collis expressed satisfaction that at a large meeting of this nature there should be no one rising to insist too strongly upon the colour users' point of view. He thought the time had come when the policy of the corporation should receive more consideration from the point of view of the shareholders. Shareholders were induced some years ago to invest in the corporation from patriotic motives, indeed, the corporation was formed largely at the instigation of the Government. In his judgment, however, the Government had done very little for the corporation since. Nevertheless, the corporation had now reached such a position that the I.G. was asking it to enter into a kind of partnership. A greater compliment could not be paid to the management than that. It was a very great achievement of which the chairman and directors had every reason to be proud. He heard with regret that the chairman was anxious to be relieved of the post of managing director, and could only hope that his retirement would be postponed as long as possible.

Mr. Peter Kenyon expressed a hope that research work would be carried out in the production of medicine and perfumes.

Mr. G. W. Bentley, speaking as the representative of a large colour-using firm, said the negotiations with the I.G. had caused some disquietude. He would, therefore, like an assurance from the directors that before any arrangement was completed the colour-users of this country would be consulted.

The chairman replied that throughout the negotiations he had made it perfectly plain that the consuming interests of the country would be consulted before any definite decision was come to. Indeed, the colour-users had already been consulted, and because of certain recommendations they had made, the heads of the proposed agreement had been modified.

Mr. McNaughten expressed a hope that the attitude of the colour-users would not be misunderstood. Many, like his own firm, invested in the corporation from patriotic motives, and were glad to see the improvement in its position, but, after all, the corporation depended upon the colour-users.

The resolution was then put, and carried unanimously.

Professor W. H. Perkin and Field-Marshal Sir William Robertson were re-elected directors, and Messrs. Thomson, McLintock and Co. were re-appointed auditors for the ensuing year.

In moving a vote of thanks to the chairman, Mr. Sutcliffe Smith defended the colour-users from the charge of insisting too keenly upon their own interests. They had, he said, always supported the developments of a dyestuffs industry in this country. He congratulated the chairman upon the progress made, and expressed general approval of the reconstruction proposals, which he had advocated some time ago.

The motion was seconded by Mr. Oxley, and carried with acclamation.

Magadi Soda Company's Affairs

Compulsory Order for Winding Up

ON the petition of the Controller of the Clearing Office appointed by the Board of Trade under the provisions of the Treaty of Peace Order 1919, Mr. Justice Eve, in the Companies Winding-up Court on Tuesday, made a compulsory order for winding up the Magadi Soda Co., Ltd., a company formed to work the concession of a soda lake in the Kenya Colony, East Africa.

Mr. Simonds, for the petitioner, a creditor for nearly £10,000, said a scheme that had been mentioned on a previous occasion had fallen through and another adopted and, it was said, approved by the Colonial Office. So far as he could understand, the latter, which was not satisfactory to his client, provided that the unsecured creditors should be given preference shares in a reconstructed company to a nominal amount of 75 per cent. of their debts.

His Lordship: Is that what is called the Brunner Mond scheme?

Mr. Simonds: No, that is the scheme which has been abandoned.

His Lordship said it was suggested that if a winding-up order was made the Colonial Office would not entertain the idea of renewing the concession.

Mr. Highton Pollock, for the Colonial Office, said that was not the case. The Colonial Office was in favour of the reconstruction of the company so that its valuable asset should be made the best use of in the interests of the shareholders and the Colony.

The Brunner Mond Scheme

Sir Douglas Hogg, K.C., said he appeared for debenture holders for £8,000 and shareholders for a large amount. The Brunner Mond scheme would have involved no assessment upon the shareholders, the fact being that the shareholders would get fully-paid shares in the new company and Brunner Mond would put in a quarter of a million. It now appeared that that scheme was to be dropped and another was put forward which would involve an assessment on the shareholders. The only ground for suggesting that the Brunner Mond scheme should be dropped and the other pressed forward was that the Colonial Office had disapproved of the former. But the Colonial Office could hardly have been fully informed of the facts.

Mr. Pennell, a shareholder and debenture holder, supported a compulsory order.

Mr. Roope Reeve, K.C., for the company, applied for an adjournment to give the creditors and shareholders an opportunity of considering the scheme. The proposed assessment amounted to 3s. 6d. a share. The Brunner Mond scheme had not found favour with the Colonial Office because that Department suspected a monopoly. The whole of the assets of the company consisted of a concession from the Kenya Colony to make a 90-mile railroad and to extract soda from a lake.

His Lordship: Is this the site of Sodom and Gomorrah? (Laughter.)

Mr. Reeve: I do not know. He added that the concession was a very valuable one, but would be forfeited if there was a winding up. Every effort should be made to retain the goodwill of the Colonial Office.

His Lordship: Goodwill will not extract much of this soda.

Mr. Reeve said that supporting his application was the National Bank of India, a creditor for £70,000.

His Lordship: Guaranteed creditor.

Mr. Bennett, K.C., for the receiver, appointed by debenture holders, said it was very desirable that the scheme should be passed by the creditors.

Sir Douglas Hogg said if the official receiver were able to represent to the Colonial Office that everyone connected with the company and the Governor of the Colony wanted the scheme, surely a Government which professed to believe in self-determination would not over-ride the wishes of the Colony.

His Lordship said the matter had been delayed long enough. A Government Department, a creditor for £10,000, presented the petition and he was appealed to to let it stand over in order that a scheme might be passed, and he was told that if he made an order the Heavens would almost fall. He had, accordingly, let it stand from time to time, with the result that they were not a whit nearer a solution. He did not intend to let it stand over longer, and he, therefore, made the usual compulsory order.

The Future of the British Dyestuffs Industry

Institute of Chemistry and the Dye Combine

The following Memorandum has been approved by the Council of the Institute of Chemistry, and forwarded to the Board of Trade, to Members of Parliament and to the Press :

HAVING regard to the wide discussion upon the position of the British Dyestuffs Industry and the possibility of an agreement being come to between the British Dyestuffs Corporation and the Interessen Gemeinschaft, the Council of the Institute of Chemistry, representing the main body of professional chemists in the country, desire to give publicity to their views on certain aspects of this matter, for the careful consideration of Members of Parliament and others concerned.

The Council hold the opinion that the progress which has been made in Great Britain in the art of manufacturing synthetic dyes and their essential intermediates during the past ten years is very remarkable.

The industry as it exists to-day may be regarded as an entirely new creation rather than as an outgrowth from the small and languishing industry existing before the war. To take one striking example of this change, reference may be made to the highly specialised industry of vat dyes.

Prior to 1914 the modern vat dyes were entirely a monopoly of German and Swiss firms. Now these valuable and essential colours are manufactured by three or four British firms and, what is satisfactory to the users, the prices have been greatly lowered.

Nevertheless our present position is only comparable with that of the Germans before the war, in that we have been able to prepare in a pure condition the dyestuffs hitherto produced by them. Except in perhaps one or two instances, the research work carried out does not represent new knowledge, and much remains to be done in the way of scientific research if we are to retain a position even of equality in the future.

Owing, however, to the exceptional conditions prevailing in Germany in regard to rates of exchange and consequent amortisation of capital charges, the German makers have a very great advantage over our producers, and could at present undercut the latter completely, were it not for the operation of the Dyestuffs Act. Under this Act the Licensing Committee refuses applications for the importation from abroad of any dyes which are made in this country, provided the prices charged by British makers are not more than three times the pre-war prices of such so-called " contentious " dyes.

This arrangement—although a very severe test of industrial efficiency in the case of the more complex dyes still in an experimental stage—is nevertheless accepted under pressure in the majority of instances by the British dye makers, who are continuing to make good progress in improving their works processes and in extending their plants, so that their efficiency continually improves under the Act.

The preservation of our national independence in the matter of dyestuffs and fine chemical industries must remain for a period of years dependent upon some such protective policy, owing to the exceptional conditions briefly referred to above.

The Council of the Institute insist most strongly on the necessity, in the best interests of the nation, of developing and maintaining a successful dye-making industry. If it is maintained we shall have extensive and complicated plant and large numbers of highly trained and skilled chemists and chemical engineers available for the service of the nation in any time of emergency—an asset of immense value and importance.

The Council, while emphasising the great progress and success which has been attained already in this industry, desire to state that they are confident that the necessary skill and ability to achieve complete success are available, provided sufficient support is given meanwhile.

The Importance of Chemists

A great and developing dyestuffs industry must maintain a very large staff of chemists in carrying out researches leading to the discovery of new dyes, in exercising the necessary scientific control to maintain efficiency, and in making improvements in existing processes. In addition to the large staffs directly employed, the operation of the dyestuffs factories stimulates other chemical activities which give employment to many professional chemists. Among the large-scale developments from the German dyestuffs industry may be cited the following :—The utilisation of atmospheric nitrogen (with its important bearing on agriculture and national defence), the manufacture of synthetic drugs such as aspirin, antipyrin and salvarsan, the production of photographic chemicals, synthetic tanning materials, artificial essences, flavourings, and resins, and more recently the discovery of preservatives against moths and insect pests.

The creation of such flourishing industries has a most stimulating effect on the scientific activities of the universities. Prior to the war the chemical schools of Germany became thronged with German and foreign students, and the atmosphere of research which was thereby engendered in all branches gave Germany the chemical hegemony of the civilised world.

As the result of the achievements made in developing the organic chemical and dyestuffs industry in Great Britain a similar repercussion has occurred between the industrial and academic branches of the chemical profession. For whereas in the most important universities and colleges there were before the war about 1,700 students being trained annually, there were soon after the war over 4,200 such students.

As a result of this increased activity, research schools have sprung into existence in our universities comparable in size and in the standard of their investigations with the best schools of the Continent. Students, well instructed and trained in research methods, are at the disposal of industrialists for the chemical exploitation of our natural resources, without which we cannot hope to maintain our place among the nations.

Productivity

Under modern conditions the power and pre-eminence of a modern state depend chiefly upon the application of scientific control to the forces of nature. In the preceding generation the application of physical science (engineering) has held greatest sway. In the present generation the greatest additional power is being derived from the application of chemical science, and the potentiality of a country in a large measure depends upon its ability to employ chemists productively for peaceful purposes. The influence of chemistry in procuring efficiency and cheapening production extends to every sphere of industry and of communal activity. It is felt that in discussions concerning the fostering of the chemical industry the vital interests of the country and of chemistry, on which so much depends, have received too little attention.

Unified British Effort

The Council of the Institute would view with disfavour any agreement entered into, even if favourable to the limited number of chemists employed by the British Dyestuffs Corporation, Ltd., which would act unfavourably towards the large body of chemists employed by the independent dyemakers and fine chemical manufacturers of this country. Any step taken by the Board of Trade should be, so far as possible, directed to the unification of British effort, which unification, apart from being desirable in itself, is necessitated by the powerful unification of the German Interessen Gemeinschaft.

To Sum Up

Great progress has been made in the dye-making industry, and the technical ability is in this country to bring it to complete success and make this country independent of Germany in this respect.

A successful dyestuffs industry provides a numerous personnel and large plant, able quickly, in time of need, to turn out a wide variety of complicated organic compounds—an important national asset. It provides in addition an excellent training school for industrial chemists.

It should be emphasised that the good position already won by the British dye manufacturers should be thoroughly safeguarded, so that the productivity of the British Dyestuffs industry should not in any way be curtailed or hindered.

On behalf of the Council of the Institute of Chemistry,

30, Russell Square,
London, W.C.1.
March, 1924.

G. G. HENDERSON,
President.

Metallographic Photography

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the excellent article on page 27 of your issue of the 5th inst. (Metallurgical Section), in which you refer in kind terms to the "Metalworks" photomicrographic outfit, for whose design I was responsible, would you kindly allow me to make one slight correction—that is, that the section of the metal to be examined has to be provided in the usual way? The apparatus described provides only for the examination, and particularly for the photographing of the specimens, as you say, almost incredibly easily and quickly.—Yours, etc.

F. ROGERS.

Sheffield, April 9.

Foreign Trade in March

PRELIMINARY figures of the value of overseas trade in March, published in the *Board of Trade Journal*, show a considerable advance in imports as compared with February, but a decided set-back in exports of British goods as a whole. The value of the latter has fallen by £6,872,000, and re-exports have also declined by £530,000. Under imports the increase amounts to £7,023,000. This is due mainly to larger consignments of foodstuffs, but there was also a notable rise in imports of manufactured goods. Exports of manufactured goods in March were only £46,715,248 against £52,661,655. No figures are available at the moment as to chemicals, but these will be dealt with in our issue next week as usual.

Theory and Practice of Pumping

WHAT is believed to be the first standard reference work on *The Modern Theory and Practice of Pumping* will be published next week. Written by Mr. Norman Swindin, A.M.I.Mech.E., it is a comprehensive story of viscosity from an industrial point of view, and a description of industrial viscometers, their standardisation, calibration and use. A new theory and formulæ for the air lift are given, together with studies of the efficiency of displacement pumps and calculations of film resistances as met with in practice. There are chapters on the pumping of oil, corrosive liquids and specially thick substances. The work concludes with a full bibliography of recent works and papers. The oil, gas, and margarine industries, to mention only three, will find new formulæ contained in this work a direct help to more economical and more efficient working. The book will be published by Ernest Benn, Ltd., at 43s.

Voluntary Liquidation of Chemical Engineering Concern

IN pursuance of the provisions of the Companies (Consolidation) Act, 1908, a meeting of the creditors of the Standard Chemical Engineering Co., Ltd., 36, Southampton Street, Strand, W.C. (in voluntary liquidation), was held in London on April 7, when the liquidator, Mr. Sidford, said that no statement of affairs had been presented, but the liabilities to unsecured creditors amount to, roughly, £5,147. The only assets were the cash at bank, £131 16s. 11d., good book debts £50, and doubtful debts £196. The company was originally called the Fisher Chemical Engineering Co., Ltd., and the name was changed by special resolution on April 29, 1920. The company was incorporated on March 6, 1918, with a nominal capital of £5,000, divided into 5,000 shares of £1 each. The company was formed for the purpose of manufacturing and selling plant for the extraction of oil. For the last three years the oil industry had been at a standstill and in consequence the company's activities had been restricted. The liquidator was advised that the plant made by the company was considered to be one of the best of its kind in the world. When conditions became normal, he said, little difficulty should be experienced of disposing of four plants which the company had in stock and which at to-day's price should fetch over £5,000. In addition to this, the company still held the drawings, patterns, and patent rights, and there were parts of plants which were worth between £500 and £600. A resolution was passed that the Millwall Engineering Co. apply to the court for the appointment of Mr. J. Myers, C.A., London Wall, E.C., as liquidator, in place of Mr. Sidford, the present liquidator.

Estimation of Minute Percentages of Iron in Drugs and Chemicals

A Suggested Method

To determine minute percentages of iron in materials such as pure chemicals and drugs, the sulphocyanide colorimetric method is generally preferred.

It is not intended to advocate that one method can be applied without variation to all and sundry, but it is usually conceded by most chemists that the method mentioned is the most desirable for all ordinary purposes.

Among other advantages, this estimation is claimed to secure accurate results in presence of large quantities of impurities. The sulphocyanide method was at first confined to metallurgical fields, and probably the earliest description of this process given in Beringer's "Text Book of Assaying."

Further investigations of the most accurate method of applying the determination have been made, and some of these, as used for testing drugs and chemicals, are here given.

Some Points on the Usual Method

The method consists of first dissolving the material in a suitable acid, or where of an insoluble nature, fusing with a fusion mixture and extracting the melt with water, and acidifying. A solution of permanganate of potash is added until the solution is tinted, after which it is boiled, cooled, and diluted.

Potassium sulphocyanide is then added and the red coloration produced compared with that of a standard iron solution prepared under similar conditions.

The solution is diluted until its depth of colour is identical to that of the standard, and the percentage of iron present computed by proportion.

This is the description usually given in analytical text-books, together with a few details of the effects caused by altering the conditions. According, however, to the researches of two well-known chemists, the red coloration developed is not necessarily proportionate to the percentage of iron, but is greatest when the sulphocyanide and iron are present in equal proportions. The inaccuracy is due to the fact that the red coloration, formed by a ferri-potassium sulphocyanide, which is decomposed by water, cannot serve as a guide to the amount of iron present, since the intensity is a function of the dilution.

Difficulties with Sulphocyanide

A double salt is formed which on dilution is converted to another double salt of iron and potassium sulphocyanide. Solutions of the latter salt are lighter coloured, and are tinged with orange. It has also been proved that solutions of ferric sulphocyanides and coloured solutions of double tartrates and acetates of the alkalis are subject to progressive dissociation of the pigmentary salt, and therefore impossible of comparison with standards in colorimetric estimations. Despite the fact that these inaccuracies are known, the method is still largely adopted, but many precautions are taken that the standard and solution under examination are compared under exactly similar conditions. Best results are secured by using cold solutions and making the comparison immediately after addition of the potassium sulphocyanide. An excess of free acid tends to increase the depth of colour produced, particularly with nitric acid, as nitrous acid itself is capable of forming a red colour with potassium sulphocyanide.

The method is seldom capable of producing quite so accurate results when phosphorus or arsenic are present, as the effect of these requires to be eliminated by addition of an excess of hydrochloric or other acid. Copper is one of the few metals which are capable of interfering with the colour produced, but this metal is seldom found present in ordinary drugs or chemicals, with a few exceptions. If any copper is present it is readily noticed, as the solution will have a greyish-green tint, which may then be tested with ammonia for the characteristic blue coloration. The estimation takes longer to perform when the latter impurity is present. One method consists of precipitating the iron as arsenate, redissolving in dilute hydrochloric acid, and proceeding as before.

Very few processes in which the iron has first to be precipitated before applying the colorimetric determination, will yield satisfactory results.

Satisfactory Modified Method

The following description gives details of a modified method which has furnished the best results up to the present time. After dissolving the material by one of the usual methods, the solution is diluted considerably and made to contain about 5 per cent. of nitric acid. The solution is treated with potassium sulphocyanide, and when the dirty reddish colour develops, about 10 c.c. of ether are added and the liquor thoroughly shaken up. The tubes used for the test are made of very clear glass, graduated, and provided with emery stoppers. By shaking up with ether, the sulphocyanide compound of potassium, iron, etc., is decomposed and the iron sulphocyanide dissolved out alone. The aqueous solution should be completely decolorised if the proper conditions have been adhered to. As the colour of the ethereal layer deepens on standing, it should be allowed to rest for some time before comparing with the standard iron solution.

The standard iron solution preferred for this work contains about 0·01 gram of iron per litre, and is made up by dissolving ammonium ferro-sulphate in distilled water containing a little sulphuric acid.

All reagents used throughout must be carefully examined for traces of iron, and their combined result subtracted from the amount of iron present in the solution analysed.

In view of the fact that certain organic matter may interfere with the colour produced, it is a safe plan, when time permits, to evaporate the solution to dryness with nitric acid, prior to making the colorimetric comparison.

When this precaution is taken the method leaves little to be desired, and may be applied for determining iron in almost any class of material. C. C. D.

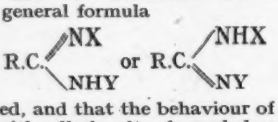
Society of Chemical Industry

Annual Meeting of Manchester Section

THE annual meeting of the Manchester Section of the Society of Chemical Industry was held on Friday, April 4, Dr. H. Levinstein presiding. The whole of the Committee and officers of the Section were re-elected, there being no occasion for a ballot. The hon. secretary (Mr. L. Guy Radcliffe) read his report of the Transactions of the Section for 1923–24. The numerical strength of the Section was 506, as against 510 at this time last year. The number of papers arranged for or read at the eight meetings of the Session was twelve, and a joint meeting has been held with the Institute of Chemistry, the Society of Dyers and Colourists, and the Manchester Literary and Philosophical Society. On December 7 there was an innovation in the shape of a joint meeting between the Manchester Section and the Institution of the Rubber Industry, whilst on February 22 there was a joint meeting with the Liverpool Section. The attendances at all the meetings have been exceedingly good but, on the whole, below those of last session. This has been probably due to the meetings of other Societies overlapping and to the prevalence of unfavourable weather. Reference was made to the death of Mr. William Thomson, a former chairman of the Section, whose interest in the Society commenced with the birth of the Society and ceased only with his death. Professor Pyman proposed and Mr. John Allan seconded the adoption of the report, and the motion was carried unanimously. A very hearty vote of thanks was accorded the hon. secretary for his services during the year.

"The Tautomerism of Amidines"

Professor F. L. Pyman, D.Sc., F.R.S., in a paper on this subject stated that von Pechmann found that only one amidine of the general formula



could be prepared, and that the behaviour of such compounds on alkylation with alkyl salts depended upon the relative characters of X and Y. Where these were similar (*e.g.*, phenyl and tolyl), and he obtained on alkylation a mixture of the isomeric alkyl derivatives, but where they differed considerably in character (*e.g.*, phenyl and methyl) he was only able to isolate a single alkyl derivative. In the course of the present series of investigations it has been shown that there is no qualitative difference between the two cases where X and Y are similar and where they differ in character. In both cases a mixture of the two possible isomeric alkyl derivatives results, but the relative yields of the two are largely influenced by the relative characters of X and Y. In earlier papers (*Trans. Chem. Soc.*, 1923, vol. CXXIII, pp. 367, 3,359) the behaviour of open-chain amidines was examined, and the present communication (with C. E. Hazeldine and (the late) John Winchester) records the results of treating 4(or 5) nitroglyoxaline and 4(or 5) phenylglyoxaline with dimethyl sulphate. It was found that the alkylation of 4(or 5) nitroglyoxaline in this way gave 5-nitro-1-methylglyoxaline as the main product of the reaction, with mere traces of the isomeric 4-nitro-1-methylglyoxaline, and that all of a number of compounds containing the nitro group in the 4(or 5) positions, with various other groups in the 5(or 4) positions, behave similarly, the main product being always the isomeride with $NO_2 : Me = 5 : 1$. According to unpublished experiments (with I. E. Balaban) the bromine atom has an influence similar to but not so powerful as that of the nitro group, while the known results of alkylating xanthines show that the carbonyl group is similarly 5 : 1-derivative. The influence of the phenyl group, however, is different, for the alkylation of 4(or 5) phenylglyoxaline under similar conditions gives, as the main product of the reaction, 4-phenyl-1-methylglyoxaline together with a small quantity of 5-phenyl-1-methylglyoxaline. The methods of determining the orientation of the methylated nitro- and phenylglyoxalines were described.

New Cobalt Extraction Process

Industrial Application of Cobaltammines

AT the joint meeting of the Chemical Engineering Group and the Birmingham Section of the Society of Chemical Industry, in addition to Mr. China's paper, a contribution on "The Separation of Cobalt from Nickeliferous Ores by the Purpureo-Cobalt Chloride Process" was made by Professor Gilbert T. Morgan (head of the Chemistry Department at the University of Birmingham) and Mr. J. D. Main Smith. Metallic cobalt and its salts are, they pointed out, obtained commercially from arsenical cobalt ores containing considerable amounts of nickel and iron, together with smaller quantities of other metals such as copper and bismuth. After preliminary treatment to remove part of the arsenic, a calcined speiss is obtained, consisting largely of arsenides and oxides. This speiss is dissolved in hot concentrated hydrochloric acid, iron and arsenic removed as ferric arsenate by hot milk of lime, the metals of analytical group two removed as sulphides with hydrogen sulphide, and the remaining iron as ferric hydroxide by milk of lime. From the final liquid the peroxides of cobalt and nickel are fractionally precipitated with bleach-liquor, cobalt being separated nearly quantitatively before nickel.

In the course of the researches on residual affinity and co-ordination, in which cobalt has played an important part in the elucidation of the constitution of mordant dyes, considerable quantities of various cobaltammines have been prepared and a large scale process has been devised for the rapid and economical preparation of purpureo-cobalt chloride (chloropentammino-cobaltic chloride) $[Cl(NH_3)_5Co]Cl_2$. This carmine-red complex salt, originally discovered in 1851 almost simultaneously by Genth in America, Fremy in France and Claudet in England, was utilised by the last of these for the separation of cobalt from its ores. This method is frequently referred to in the literature relating to cobalt, although the process does not appear ever to have been in commercial use, due doubtless, not to the incompleteness of the separation, but to the costly nature of the process, excess of hydrochloric acid, ammonia, ammonium carbonate and chloride being necessary.

A Practicable Process

An improved process was then described which was stated to be well adapted for large scale operation and under complete control at all stages. The free ammonia and the combined ammonia in the cobaltammine salt and ammonium chloride are readily recoverable. On boiling with the calculated amount of chalk or milk of lime, the purpureo-cobalt chloride readily yields ammonia, hydrated cobaltic oxide being precipitated and calcium chloride passing into solution. Apart from normal wastages, the only reagents other than hydrocloric acid necessary for solution of the ore are hydrogen

peroxide and chalk or lime. On a works scale the use of hydrogen peroxide, which, however, is now cheaply available, could be dispensed with in favour of aerial oxidation, under pressure if necessary for rapid working. The presence of metals yielding hydroxides soluble in ammonia, such as nickel and copper, affects neither the amounts of reagents necessary nor the yield and purity of the product. Metals yielding hydroxides insoluble in ammonia may be removed by filtration after oxidation, or may be dissolved out of the product by dilute hydrochloric acid, in which the product is almost insoluble.

Cobalt-nickel ores containing a high percentage of nickel are usually worked for nickel by the Mond carbonyl process, cobalt accumulating in the residues, whereas ores containing a high percentage of cobalt are worked mainly for cobalt by the Wiggin process. The crude cobalt oxide thus produced invariably contains a considerable amount of nickel, which is largely removed by extraction with dilute hydrochloric acid, but analytically nickel-free cobalt oxide is never obtained. The authors found, however, that analytically pure cobalt oxide is obtainable practically quantitatively by the purpureo-cobalt chloride process, and that the presence of nickel in the original ore or mixture, in amounts varying from 5 to 50 per cent. of nickel, does not affect the yield or purity of the cobalt product.

Four chemical operations are involved in the process: solution of the ore, removal of arsenic, formation of the insoluble cobalt compound and its decomposition to yield cobalt oxide.

The authors expressed thanks to the Advisory Council of the Department of Scientific and Industrial Research for grants which have helped to defray the expense of the investigation.

Carbon Monoxide Hazards

American Investigation of Garage Dangers

An interesting investigation has just been carried out by the U.S. Department of the Interior at the Bureau of Mines Experimental Station at Pittsburg, which effectually disposes of the fallacy that air in a garage is safe to breathe as long as a motor continues to run. An ordinary touring car of popular make was run into a brick garage having a capacity of approximately 3,000 cubic feet, a dog was placed upon the driver's seat, and the engine allowed to continue running at an idling speed, which is much slower than the average motorist would use for "warming up" purposes. The doors of the garage were closed, and after twenty minutes' operation of the engine the dog lost consciousness and fell to the floor of the car. An analysis of the air at this time disclosed the presence of 1·3 per cent. of carbon monoxide, which is sufficient to cause unconsciousness and death in a few minutes. The engine was allowed to run until it stopped from lack of air, which occurred at the end of two hours, when the percentage of carbon monoxide present in the garage atmosphere was indicated as 2·1 per cent., an almost instantaneously fatal amount. The engine functioned six times as long as the dog retained consciousness, proving conclusively that the continued operation of an automobile engine in a closed garage is no indication as to the condition of the air and that the engine will continue to function long after the operator has lost consciousness. This experiment was conducted in a garage several times as large as the average one-car garage, and it is safe to assume that a dangerous concentration of carbon monoxide would result in a one-car garage in less than half the time recorded in this experiment. In other words, the dog would have lost consciousness in about ten minutes after the starting of the engine, which would have continued running for about one hour. The Bureau of Mines calls attention to the great danger of anyone entering a closed garage for the purpose of shutting off a running engine. This frequently happens on occasions when a motorist starts his engine and leaves it running while he returns to the house for something he has forgotten. It is quite certain under such conditions that dangerous concentration of carbon monoxide will occur in a very short time if the garage is closed, and when the motorist returns he is likely to encounter an atmosphere sufficiently charged with carbon monoxide to render him unconscious in two or three minutes, and to cause his death if he is not promptly rescued.

Pulverised Fuel Developments

Vickers and International Combustion Engineering Company's Dinner

At the Hotel Cecil, London, on Thursday, April 3, the Vickers and International Combustion Engineering Co. gave a complimentary dinner to Mr. C. W. E. Clarke (consulting engineer for Dwight P. Robinson Inc. of New York), Mr. F. H. Rosencrants (chief mechanical engineer of the Electric Bond and Share Co., a subsidiary of the General Electric Co., of New York) and Colonel E. McCullough (structural engineer connected with Dwight P. Robinson Inc.).

Sir Trevor Dawson, who presided, welcomed the guests and visitors. In the course of his remarks he said that during the last year there had been an enormous development in the use of pulverised fuel in America. Three times the amount of power had been obtained by its means than was obtained three years previously. In the United States they had between 200,000 and 250,000 sq. ft. of heating surface using powdered coal by the "Lopulco" system.

In reply to the toast of "Our Visitors," proposed by Mr. David Wilson, Mr. C. W. E. Clarke said that the American had shown an aptitude for taking the other fellow's ideas and going one better. That was particularly true of the turbine which, he thought, originated here. When starting to extend the Duquesne Light Co.'s Colfax station a year ago he advised that pulverised coal plant should be put in. Although stations of 300,000 kW were considered very large three years ago, the Edison Co. now talked about 700,000 kW. Another important development was the air heater. About three years ago, after he had been over an air heater station in England, he put in an experimental heater of 12,500 sq. ft. and the results had been so satisfactory that eight more had been put in. Another development was the use of 2 in. tube economisers. The use of pulverised fuel plant got more common every day, and there had only been one large station laid down in the last year that had not adopted it. Mr. Clarke concluded by showing by means of lantern slides and describing the model pulverised coal plant which has given highly satisfactory results at Colfax.

Mr. F. H. Rosencrants said the intense activity in the development of power plant in the past few years had given a great opportunity for the introduction of the pulverised fuel system. He did not think 17,000 B.Th.U. per kW. was going to be a record that would stay long.

Colonel E. McCullough said coming to England and talking about powdered coal was like carrying coals to Newcastle; its use was suggested here as long ago as 1860.

Mr. George Usher, who gave the toast of "Our Guests," said that with regard to the desirability of using powdered coal, 25 per cent. of the coal hewn never saw the light of day, but with pulverised fuel plant it became a commercial product.

Mr. J. H. Bowden said when he visited the United States he became absolutely convinced that the claims made for the pulverised fuel system could be substantiated. He was particularly struck with the installation at Henry Ford's works, where a plant that had been stopped for eight hours was started up, and in twenty-five minutes indicated 230,000 lb. of steam evaporation an hour. The system was a revolution in boiler-house work.

Boric Oxide for Glassware

A scientific statistical examination of the use of boric oxide in glass has just been issued by Borax Consolidated, Ltd., in the form of a well-produced booklet arranged and compiled by Mr. H. Goulding-Brown, with a foreword by Professor W. E. S. Turner, under the title "Boric Oxide as a Constituent of Glass." Borax or boric acid is added to glass to increase its durability by giving it greater conductivity and lower thermal expansion. The greater part of the book is taken up with collected information from various sources relating to the composition, physical properties and chemical resistance of various glasses containing boric oxide. The book should prove extremely valuable, and is not to be confused with the usual type of trade publication. As Professor Turner points out in the foreword, the subject is dealt with in an impartial and even critical manner, so that it should be of good service to those interested in the manufacture not only of scientific, but of all good glassware. Copies can be obtained by readers on application to the firm producing the brochure.

Chemical Matters in Parliament

Oil Fuel from Coal

Mr. Trevelyan, President of the Board of Education (House of Commons, April 2), in reply to questions on the subject of the production of oil fuel from coal, said: The question of the production of motor spirit and other oils from British coal is under continuous investigation by the Fuel Research Board, both by means of their own researches at His Majesty's Fuel Research Station, Greenwich, and by a close study of other attempts to solve this important problem both here and abroad. The Board is, however, of the opinion that neither its own work nor that of any outside body hasyet proved the economic possibility of such production on a national scale."

Art and Science Buildings

Viscount Ednam opened a debate in the House of Commons on April 3 on the motion that a sum not exceeding £210,930 should be granted for expenditure in respect of Art and Science Buildings in Great Britain. A notice was appended that £107,000 had already been voted on account, and after a short discussion the motion was agreed to.

Safeguarding of Industries Act

Mr. Webb, President of the Board of Trade (House of Commons, April 8) replying to Mr. Remer said that His Majesty's Government have decided not to introduce legislation to extend the duration of the provisions of Part II of the Safeguarding of Industries Act which deal with the making of Orders on the ground of depreciation of foreign currency, and that these provisions, and the duties which have been imposed under them, will accordingly lapse on August 19 next.

British Dyestuffs Corporation

Mr. Waddington (House of Commons, April 8) asked the President of the Board of Trade whether he was aware that Professor Green, when engaged as head of the Research Department of the British Dyestuffs Corporation, devoted his whole time to the duties; and that Professor Perkin, who has been appointed in his place, only devotes a small portion of his time to the duties, and has other professional appointments; and what was the respective salaries, including directors' fees, paid by the British Dyestuffs Corporation to Professor Green and Professor Perkin.

Mr. Webb: I understand that the answer to the first part of the question is in the affirmative. As regards the remainder of the question, I have no knowledge as to the amount of time which Professor Perkin is able to devote to the affairs of the corporation, or as to the financial arrangements between the corporation and the gentleman named.

Mr. Waddington: Will the Government not receive a report from the Government directors on the Dyestuffs Corporation?

Mr. Webb: It is not the practice for the Government directors to report regularly to the Government upon the ordinary procedure and the commercial work of the corporation. We maintain communication with the Government directors and with any special matters in which the permanent interests of the industry are concerned.

Mr. Waddington: Is the permanent interest of the industry being promoted by a part-time officer supplanting a whole-time officer?

Mr. Webb: I am afraid that I cannot accept that description of the substitution of Professor Perkin for Professor Green. I do not think that accurately describes the situation, but I can assure the hon. Member that the whole position is very seriously engaging the attention of the Government. It is hardly possible to deal with it effectively by way of question and answer.

German Dyestuff Makers

According to a Frankfort report the German Interessen Gemeinschaft is about to begin the large-scale working of a patented process for imparting a permanent wool-like appearance to cotton goods. It is mentioned that in Germany the process will be in the hands of Meister, Lucius and Brüning, and that arrangements have been made for the process to be worked abroad by a number of important concerns. It is also stated that negotiations are proceeding between the I.G. and the Swiss dye-stuff firms with a view to fixing standard prices and eliminating competition generally in the various export markets.

B.D.C. Excess Profits

Sale of Process to Du Pont Co.

The Appeal Court on Friday heard an appeal by the British Dyestuffs Corporation, Ltd., of Manchester, from a judgment by Mr. Justice Rowlatt holding that they were liable to pay excess profits duty on ten annual sums of £25,000 paid to them by an American Company, Du Pont de Nemours, for a secret process for making synthetic indigo.

Sir John Simon, K.C., for the appellants, argued that these payments were not income but payment for a capital asset. In 1916 the appellants acquired a German factory at Ellesmere Port and with it a secret process for making synthetic indigo, which up to that time had been known only to Germans. The American Company afterwards bought the secret from the appellants with the right to use it in America and agreed to pay ten annual sums of £25,000 ending in 1927. This was a sale of part of the appellants' assets and therefore it was wrong to regard the money received as profits.

Lord Justice Bankes, without calling on the Attorney-General for the Crown, said the real question was whether the transaction was a parting by the appellants with a part of their property for a price or a method of trading by which they received this sum as part of the gains of trading. He read the agreement as a trading convention for the mutual advantage of the parties as to how and where their respective businesses were to be carried on. The annual payments were in the nature of royalties and therefore must be regarded as profits. Therefore, the view of the Judge below was right and the appeal failed.

Two Cases of Lead Poisoning

Two inquests held in the Birmingham district recently have referred to lead poisoning. On Thursday, April 3, the City Coroner (Mr. Isaac Bradley) resumed the adjourned inquiry into the death, on March 20, at Selly Oak Hospital, from suspected lead poisoning, of an employee of Henry Wiggin and Co., Ltd., Smethwick. Evidence was given that the victim had worked as a red lead dresser and packer. The coroner found, after hearing expert evidence, that the man died from lead poisoning, but there was insufficient information to show when or how the lead poisoning was contracted. He was not bound to determine these points, and that was his verdict. The second inquest, which was concluded at Brierley Hill on Friday, had relation to the death of a glass-cutter employed by Messrs. Stevens and Williams, Brierley Hill. At the previous hearing the death was attributed to cerebral hæmorrhage, but reference was made to a previous attack of lead poisoning. Further evidence adduced was to the effect that Randle had an attack of lead poisoning in 1897, and was then advised to change his occupation, but he continued in it. Mr. W. T. Rigby, analyst, said he found no detectable quantity of lead. The coroner recorded a verdict that death was due to cerebral hæmorrhage caused by the effect of lead poisoning on the arteries, but added that there was no evidence to show that there had been any recent poisoning.

Advertising Research

Mr. Thomas Bolton presided on Friday, April 4, at Birmingham, at the annual meeting of the British Non-Ferrous Research Association. Sir Frank Heath, Secretary of the Department of Scientific and Industrial Research, said that could not expect their scientific men would be able to produce means of production so marked and so extraordinary as those which resulted from the development of steam and the steam engine. They could not expect new sources of materials, and they could not see clearly any possible new means of applying power to production; but what they had right at hand was a much more perfect instrument for the study of every detail of the processes of manufacture. Scarcely a day went by in which there was in the papers not more than one reference to research in one direction or another, whereas in 1914 there was no reference at all to it. That meant that the man in the street had, willy-nilly, become conscious of the fact that research was going on. Why did firms not advertise that their products were the result of research, that they had research organisations, and were members of research associations? He did not think that was at all a far-fetched idea. There was a real, sheer business in the proper exploitation of what they were doing.

From Week to Week

MAJOR NOEL RICHARD LUCAS CHANCE has been appointed to the Commission of the Peace for Warwickshire.

MR. WILLIAM DOUGLAS HERMAN, chemical engineer, of Rainhill, Lancs, who left £10,276, gave £500 to the Rationalist Press Association.

MRS. W. J. COURTAULD, of Halstead, Essex, has given £2,000 to found a scholarship to enable boys in Essex secondary schools to proceed to the University.

MR. E. KILBURN SCOTT, M.I.E.E., A.M.Inst.C.E., has taken charge of the publicity department of the Vickers and International Combustion Engineering, Ltd., and assists with the sales engineering.

THE DEATH TOOK PLACE on Wednesday, April 2, at 8, Westcliffe Grove, Harrogate, of Mr. Ernest Edwin Dent, director of Dent, Son and Co., Ltd., tar distillers and manufacturing chemists, of Selby and West Cornforth. Mr. Dent was 38 years of age.

SIR WILLIAM BRAGG continued his course of wireless talks on Monday, dealing with the nature of gases, bringing out in a simple and popular manner the underlying ideal of the molecular theory as applied to pressure, temperature, and other phenomena.

MR. J. C. URQUHART, Chief Lecturer in Agricultural Chemistry at the East Anglian Institute of Agriculture, Chelmsford, has sufficiently recovered from his recent long illness to resume supervision of the chemical department, and the temporary engagement of Mr. R. B. Hawkins as his deputy is terminated.

IT IS REPORTED from Madrid that, as a result of the experiments in the manufacture of synthetic ammonia which have been carried out for some time past, the question is being considered of forming an industrial company with a large capital to undertake the manufacture of synthetic ammonia in Spain on a large scale.

THE ROYAL SOCIETY has received a gift of 500 guineas from Brunner, Mond and Co., to be used for the publication of results of scientific research in chemistry, physics and similar sciences. In addition a gift of £10,000 has been received from an anonymous donor for the prosecution of original research in medicine with special attention to tropical diseases, cancer and tuberculosis.

MR. A. GLYNNE LOBLEY, reader in Electro-Chemistry at Manchester University, read a paper before the Birmingham Metallurgical Society on Thursday, April 3, on the subject of "Electric Furnaces." Mr. Lobley described various furnaces designed for the melting of non-ferrous metals, and gave comparisons of the efficiency and running costs of electrical and fuel furnaces.

AT THE WEEKLY LUNCHEON of the Birmingham Rotary Club in the Queen's Hotel, on Monday, Mr. E. C. Rossiter spoke on "The Nitrogen Problem and the Fixation of Atmospheric Nitrogen." After reviewing the natural sources of nitrogen he said that we were the only country of any importance without an established nitrogen fixation industry, but there was every probability of one being established in the near future.

PROFESSOR HUGH RYAN, of the National University, Ireland, has been appointed Chief State Chemist for the Irish Free State Government. It is a temporary part-time appointment, and Professor Ryan, who has been carrying out the duties for a considerable time, will still continue his work at the University. In the estimates for the coming financial year a sum of £6,683 is provided for the State Laboratory, against £2,300 for the current year.

THE ANNUAL MEETING of the Liverpool section of the Society of Chemical Industry was held on Friday, April 4, when a paper entitled "Some Suggestions for Closer Co-operation Between the Chemical Manufacturer and the Farmer," was read by Mr. E. H. Rideout. The meeting re-elected Mr. Edwin Thompson (chairman), Dr. G. C. Clayton, M.P. (vice-chairman), Mr. E. Gabriel Jones (hon. secretary), and Dr. Alfred Holt (hon. treasurer).

THE DEATH has occurred of Mr. J. C. Hewlett, the head of J. C. Hewlett and Sons, Ltd., manufacturing chemists, of Great Eastern Street, London, a firm which was founded by his father, Mr. Charles James Hewlett, formerly of Bath, of whom he was the only son. Mr. Hewlett had been a member of the Fruiterers' Company since 1869, and was Master of that company in 1913. He was 76 years of age, and a resident of Beckenham.

OWING to rapid increase of business and especially to provide room for the designing and estimating staff, the Vickers and International Combustion Engineering Ltd. has removed from 4, Central Buildings, Westminster, to Africa House (fifth floor), Kingsway, W.C.2, where in future all correspondence should be addressed. The telegraphic address is "Vickomb Westcent," and the telephone numbers, Holborn 1384 and 5.

AT A MEETING of the Institution of Petroleum Technologists at the Royal Society of Arts, London, on Tuesday Mr. W. J. Wilson, F.I.C., read a paper on the Crude Oils of Burmah and Assam. The Burmah oils resembled other petroleums in composition, except, he said, in having a rather high proportion of aromatic hydrocarbons. The natural gas was utilised as much as possible. The Assam oils were totally different in character and contained a high percentage of solid hydrocarbons and asphaltum.

WATSON, SAVILLE AND CO., LTD., Bruce Crucible Steel Works, Sheffield, announce that the agency agreement between Mr. J. F. Melling and themselves expired on March 31, and that although it has been decided that it shall not be renewed, Mr. J. F. Melling remains a director of the company. The firm have arranged with Messrs. Bernard Holland and Co., 17, Victoria Street, Westminster, S.W.1, to take over the agency from April 1. Mr. B. A. Holland has been appointed a director of the Company.

MELDRUMS, LTD., of Timperley, near Manchester, announce that during the first quarter of the year, in addition to supplying 43 forced draught furnaces and mechanical stokers to boilers of various types, and 15 refuse destructors, they have supplied the following chemical plant in "Meldrum" acid resisting and other metals:—Nine centrifugal pumps; 80 cocks and valves; 30 steam jet appliances, such as compressors; elevators; ejectors; agitators; silent water heaters, etc.; also jacketed pans, tanks, pipes, bends, tees, "U" tubes, basins and other special parts.

THE FRENCH CHAMBER, on Saturday, April 5, adopted the Bill ratifying the Convention between the French Government and the Badische Anilin und Soda Fabrik as amended by the Senate. The Bill was passed originally by the Chamber in February, 1922, and provides for the manufacture under French Government control of synthetic nitrates by the Haber process, the patents of which are held by the Badische Company. The Senate, on March 4, modified the Bill as received from the Chamber in the direction of giving the Government more complete control over the manufacture of the articles concerned.

A GENERAL MEETING of the members of the Royal Institution was held on April 7, Sir James Crichton-Browne, treasurer and vice-president, in the chair. The Secretary reported the death of Dr. Donald Hood, a former manager and vice-president, and a resolution of condolence was passed. The Duchess of Bedford, Dr. Borns, Dr. J. C. Crocker, Mrs. Adams Frost, Mr. A. P. Griffiths, Sir Samuel Instone, Dr. David T. MacLeod, Dr. Stephen Miall, Sir Humphry Davy Rolleston, Mr. James H. Scrutton, Sir John Simon, P.C., Miss Florence Stawell, Mr. Arthur Taylor, and Lady Webb were elected members.

IN THE COURSE of a lecture entitled "Coal and Coke Combustion," delivered to the Newcastle Quaysiders Association, at Armstrong College, Newcastle, on Tuesday, Mr. Ernest Bury, M.Sc., F.C.S., said that of the coal raised in Great Britain seven-eighths was used for industrial purposes, the other eighth being applied to domestic use. Industries in this country, he said, were being crippled by the high price of coal. If this country was to prosper, drastic economies in the use of coal were needed, and small industries which could not employ trained chemists should obtain energy from central power stations.

THE PRESIDENT AND COUNCIL of the Royal Society have appointed Professor O. W. Richardson, F.R.S., of King's College, London, to be the third Yarrow Research Professor of the Royal Society. It is understood that Professor Richardson will remain a member of King's College and will continue to carry out his researches in the Physics Laboratory of the College. These professorships are endowed by means of a gift of £100,000 made to the Royal Society last year by Sir Alfred Yarrow, Bt., F.R.S. The appointment of Professor Alfred Taylor and Mr. G. I. Taylor to the first two professorships was announced at the anniversary meeting of the Society on November 30.

References to Current Literature

British

EVAPORATION.—Evaporating and drying plant. Part II. S. G. Ure. *J.S.C.I.*, April 4, 1924, pp. 350-354.

COAL.—The spontaneous combustion of coal. J. I. Graham. *J.S.C.I.*, April 4, 1924, pp. 79-87 T.

DYESTUFFS.—Dyes derived from phenanthraquinone. Part IV. Anilinoflavindulines and phenanthraquinoneazo-dyes. A. C. Sircar and D. C. Roy. *Chem. Soc. Trans.*, March, 1924, pp. 543-547.

REDUCTION.—Quantitative reduction by hydriodic acid of halogenated malonyl derivatives. Part III. A study of the mechanism of the reaction. R. W. West. *Chem. Soc. Trans.*, March, 1924, pp. 710-721.

Reduction products of the hydroxyanthraquinones. Part V. F. L. Goodall and A. G. Perkin. *Chem. Soc. Trans.*, March, 1924, pp. 470-476.

REACTIONS.—The action of nitrogen peroxide on cuprous oxide. J. R. Partington. *Chem. Soc. Trans.*, March, 1924, pp. 663-665.

Action of sodium sulphite on coumarins. B. B. Dey and K. K. Row. *Chem. Soc. Trans.*, March, 1924, pp. 554-564.

RUBBER.—New uses for rubber. P. J. Burgess. *J. Roy. Soc. Arts*, March 14, 1924, pp. 276-287.

SILICA.—The history, development and commercial uses of fused silica. R. A. S. Paget. *J. Roy. Soc. Arts*, April 4, 1924, pp. 323-339.

United States

SULPHUR.—Technology and commercial applications of sulphur. Part II. A résumé of the diversified uses of sulphur, free and uncombined, in the various arts. H. H. Wilkinson. *Chem. Age (N. York)*, February, 1924, pp. 60-62.

EXPLOSIONS.—Starch dust explosions. G. E. Chamberlain. *Chem. Age (N. York)*, February, 1924, pp. 95-97.

SOAP.—Soap as a vehicle for medicaments and disinfectants. L. W. Bosart. *Chem. Age (N. York)*, February, 1924, pp. 89-91.

PEAT.—The relation of peat to oil shale. S. Linker. *Chem. Age (N. York)*, February, 1924, pp. 63-64.

GERMANIUM.—Germanium. Part VII. The hydrides of germanium. L. M. Dennis, R. B. Corey and R. W. Moore. *J. Amer. Chem. Soc.*, March, 1924, pp. 657-674.

REACTIONS.—The actions of arsenic trioxide in water solution on certain metallic hydroxides. L. G. Story and E. Anderson. *J. Amer. Chem. Soc.*, March, 1924, pp. 533-539.

Reaction of sulphur with alkali and alkaline earth hydroxides in aqueous solutions. H. V. Tartar and C. Z. Draves. *J. Amer. Chem. Soc.*, March, 1924, pp. 574-581.

SPECTROSCOPY.—The determination of hydrogen-ion concentration by a spectrophotometric method and the absorption spectra of certain indicators. W. R. Brode. *J. Amer. Chem. Soc.*, March, 1924, pp. 581-596.

The absorption spectra of certain derivatives of paracymene. W. C. Holmes. *J. Amer. Chem. Soc.*, March, 1924, pp. 631-635.

The spectrophotometric determination of hydrogen-ion concentrations and of the apparent dissociation constants of indicators. Part I. The methods. W. C. Holmes. *J. Amer. Chem. Soc.*, March, 1924, pp. 627-631.

PAINTS.—The protective properties of paint. W. T. Pearce. *Chem. Met. Eng.*, March 24, 1924, pp. 463-467.

CARBONISATION.—Cast iron retorts for low-temperature carbonisation. C. H. S. Tupholme. *Chem. Met. Eng.*, March 24, 1924, pp. 471-473.

ANALYSIS.—Analysis of gypsum and gypsum products. F. C. WELCH. *J. Ind. Eng. Chem.*, March, 1924, pp. 238-241.

POTASH.—Potash from kelp. Part VIII. Certain equilibria used in the manufacture of potassium chloride from kelp brines. J. W. Turrentine and H. G. Tanner. *J. Ind. Eng. Chem.*, March, 1924, pp. 242-248.

FUEL.—Composition of natural gas gasoline. R. P. Anderson and A. M. Erskine. *J. Ind. Eng. Chem.*, March, 1924, pp. 263-267.

SUGARS.—Commercial invert sugar. Its manufacture and uses. S. Jordan. *J. Ind. Eng. Chem.*, March, 1924, pp. 307-310.

THEORY.—The structure of the atom. W. G. F. Swann. *J. Franklin Inst.*, March, 1924, pp. 293-321.

French

ADHESIVES.—Glue and adhesives and their application. Part XI. M. de Keghel. *Rev. Chim. Ind.*, February, 1924, pp. 44-48.

CEMENTS.—Recent investigations of magnesia cements. A. Chaplet. *Rev. Chim. Ind.*, February, 1924, pp. 51-53.

CATALYSIS.—Catalytic hydration of Schiff bases. A Mailhe. *Bull. Soc. Chim.*, March, 1924 pp. 379-382.

Catalytic decomposition of fatty acid amides. A. Mailhe. *Bull. Soc. Chim.*, March, 1924, pp. 363-365.

THEORY.—The chemical aspect of the quantum theory and the thermodynamics of photochemical reactions. D. Berthelot. *Bull. Soc. Chim.*, March, 1924, pp. 241-302.

ANALYSIS.—Observations and experiences relating to the rapid estimation of phosphoric acid by the method of H. Copaux. J. Daric. *Bull. Soc. Chim.*, March, 1924, pp. 409-414.

An apparatus for the semi-micro determination of carbon. M. Polonovski. *Bull. Soc. Chim.*, March, 1924, pp. 414-419.

DYESTUFFS.—Azo dyestuffs from methylethylbenzene. A. Mailhe. *Bull. Soc. Chim.*, March, 1924, pp. 382-383.

VANADATES.—Contribution to the study of ammonium vanadates. M. Lachartre. *Bull. Soc. Chim.*, March, 1924, pp. 321-332.

German

ACID ANHYDRIDES.—Simple and mixed acid anhydrides. W. Autenrieth and G. Thomae. *Ber.*, March 12, 1924, pp. 423-437.

SOLUBILITIES.—The solubility in water of homologous compounds. H. Fühner. *Ber.*, March 12, 1924, pp. 510-515.

STEREO-CHEMISTRY.—The physical constants of stereoisomeric compounds. K. v. Auwers and B. Ottens. *Ber.*, March 12, 1924, pp. 437-446.

The configuration of stereoisomeric oximes and the structure of oxime-N-ethers and *aci*-nitro derivatives. K. v. Auwers and B. Ottens. *Ber.*, March 12, 1924, pp. 446-461.

LIEGNIN.—The present position of the chemistry of lignin. R. Riefenstahl. *Z. angew. Chem.*, March 27, 1924, pp. 169-177.

ABSORPTION.—Absorption as the first step of chemical combination. E. Wedekind. *Chem.-Zeit.*, March 29, 1924, pp. 185-186.

ACIDS.—The classification of coniferous resin acids. O. Aschan. *Chem.-Zeit.*, March 18, 1924, pp. 149-150.

The analysis and purification of technical hydrofluosilicic acid. F. Halla. *Chem.-Zeit.*, March 27, 1924, pp. 177-178.

3-Methyl-cyclopropene-1.2-dicarboxylic acid. F. Feist. *Annalen*, March 8, 1924, pp. 125-153.

OPTICALLY ACTIVE COMPOUNDS.—Investigations on the influence of constitution on the rotatory power of optically active substances. Part XVI—Acetylene derivatives, ketones and isonitriles. H. Rupe. *Annalen*, March 8, 1924, pp. 184-204.

VALENCY.—Valency investigations. Part I. A new method for determining the strength of the union of radicles to carbon. A Schönberg. *Annalen*, March 8, 1924, pp. 205-218.

Miscellaneous

PHOTO-CHEMISTRY.—Photochemical studies. Part II.—The reducibility of silver bromide in the presence of gelatine. Part III.—The reducibility of silver bromide in the photographic plate. A. Reychler. *Bull. Soc. Chim. Belg.*, January, 1924, pp. 7-16.

ETHERS.—Contribution to the study of the methylals of primary alcohols. M. Ghysels. *Bull. Soc. Chim. Belg.*, January, 1924, pp. 57-78.

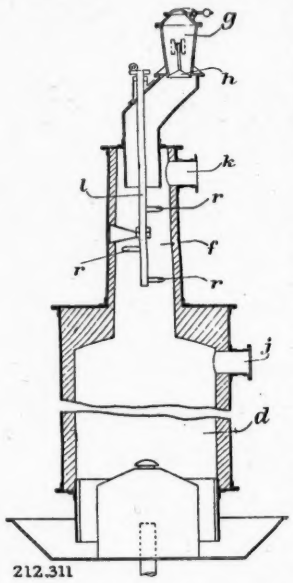
COMPRESSIBILITY.—The compressibility of alkaline salts. E. Saerens. *Bull. Soc. Chim. Belg.*, January, 1924, pp. 17-57.

Patent Literature

Abstracts of Complete Specifications

212,311. GAS PRODUCERS, PROCESS AND APPARATUS FOR UTILISING CAKING FUEL IN. A. H. Lymn, 40, Westminster Palace Gardens, Victoria Street, London, S.W.1. Application date, December 8th, 1922.

The apparatus is for avoiding the difficulty which occurs in gas producers due to the caking of coal. This caking causes irregular gasification and formation of the fuel into large lumps with open spaces through which unconsumed oxygen and poorer gas may ascend without penetrating the mass of the coal. It is known that the caking takes place between 250° C. and 500° C., and that it is more marked if the coal is quickly heated. In the present invention the caking of the coal is eliminated prior to its entry into the producer by subjecting it to a slow heat treatment at a temperature of 250° C., gradually increasing to 500° C., and agitating the coal during this treatment. The coal is fed from a hopper *g* through the conical valve *h* to a narrow vertical chamber *f* mounted on the producer *d* and communicating with it. The coal in the chamber *f* is subjected to gradual heating during its passage to the producer, and is agitated by rotating arms *r* mounted on a vertical shaft *l*. When the coal reaches the producer proper, it is non-caking and in a broken-up condition. To prevent rotation of the fuel in the chamber *f*, a second stirrer may be provided or a number of fixed arms may project inwards from the side of the casing. The products of distillation are drawn off through the outlet *k*, and the producer gas through the outlet *j*.



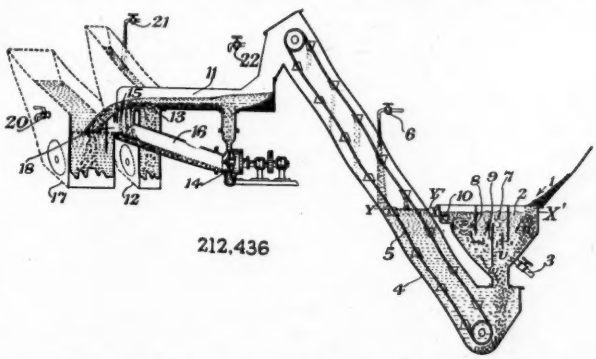
212,311

212,355. TANKS AND OTHER OBJECTS WITH ACID-RESISTING LININGS AND COVERINGS, CONSTRUCTION OF. F. E. Elmore and the Chemical and Metallurgical Corporation, Ltd., 701, Salisbury House, London, E.C.2. Application date, January 10th, 1923.

The process is for the construction of tanks, pipes, agitators, etc., for use with acid liquors, particularly hot or cold liquors containing hydrochloric acid. Such tanks when lined with enamel, glass, or ebonite are not very durable, and are not readily repaired if the lining is cracked. In the present invention, such tanks are lined with an unvulcanised sheet rubber compound, which is resistant to hydrochloric acid and other acid liquors. This material may be applied to the vessel in sheets, and the edges may be joined together to make a liquid-tight joint by applying a solvent, such as naphtha, to the overlapped edges, and pressing them together at ordinary temperature, or the edges may be joined by heating locally to about 130° C. without the use of a solvent. The article so treated is ready for use without a preliminary vulcanisation. It is found that unvulcanised sheet rubber consisting of rubber and sulphur, which would yield a flexible vulcanised product, is not suitable for use owing to its tendency to shrink. This tendency is counteracted by the addition of an inorganic filling material. A suitable composition consists of rubber 29·0 per cent., sulphur 3·1 per cent., silica 35·0 per cent., alumina and iron oxide 7·5 per cent., magnesia 13·3 per cent., lime 2·1 per cent., lead oxide 4·0 per cent., zinc oxide 1·0 per cent., and carbon 5·0 per cent. When in use, this lining is probably vulcanised superficially, and has been found to contain 0·05 per cent. of sulphur in chemical combination. This surface effect may be produced by subjecting the built-up lining to the action of boiling neutral strong brine at 105° C. for a few hours. The treated surface prevents the joining of adjacent sheets, and the surface should be removed before joints are made. In some cases the lining may first be built in the required shape, and then applied to the vessel. The lining may be protected from mechanical injury by a facing of wood or other protective material. This lining has been found to be very resistant to abrasive action—*e.g.*, in the case of tanks and agitators for treating mineral pulp. The material resists the action of sulphuric acid up to a strength of 80 per cent. when cold, and up to a strength of 20 per cent. at 100° C.

212,436. WASHING MINERALS AND OTHER SUBSTANCES, APPARATUS FOR. R. A. Henry, 78, Quai de Fragnée, Liège, Belgium. Application date, April 4th, 1923.

This apparatus for washing and classifying minerals, etc., is of the kind in which a trough is traversed by a current of water which moves in a closed cycle and classifies the material by deposition. The crude material is supplied at 1 to a compartment 2 containing water, into which compressed air is passed though an inlet 3 to agitate it. A slight ascending current of water due to the difference in levels between XX^1 and YY^1 ascends through the compartment 2, and carries the lightest material into the upper part of the compartment 7. Most of the heavier material descends at once to the bottom of the apparatus, and is removed by the conveyor 5, but some passes into the compartment 7. This material passes into the compartment 8 over a partition 9, and meets an ascending current of water which has been diverted to the left of the partition 9. This effects a further separation, and the lighter material is carried to the outlet 10 while the heavier material falls to the bottom.



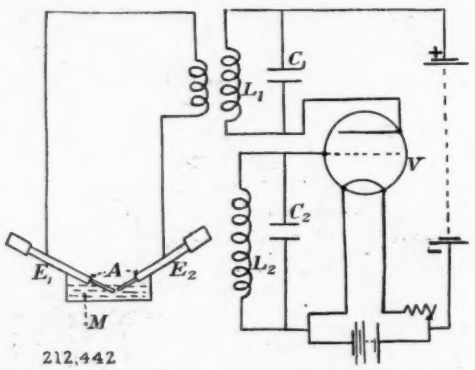
212,436

This material is delivered by the conveyor 5 to a trough 11 through which a current of water flows. The heavier constituent constituting the lower layer falls through an adjustable opening 13 into a tank 12 from which it is recovered. The lightest material is carried over the overflow 15 to a tank 17, where it is allowed to settle, and the material of intermediate density passes through another opening into the return passage 16 leading to the centrifugal circulating pump 14. The eye of the pump is only partly submerged, to avoid the suction which would be otherwise produced. The water from the tank 17 is led back to the pump over an overflow 18, so that only losses of water require to be made up.

212,442. COLLOIDAL SOLUTIONS, HIGH-FREQUENCY METHOD FOR THE PRODUCTION OF. S. H. Long, 4, Stannington Place, Heaton, Newcastle-on-Tyne. Application dates, April 16 and May 22, 1923.

This process is for producing colloidal solutions of metals and non-metals—*e.g.*, a solution of metallic silver in water. A source of energy for supplying high-frequency electric currents having a frequency of 10,000 to 1,000,000 per second is connected in a circuit consisting of capacities and inductances, so that the frequency may be varied by varying the capacities and inductances. This circuit is coupled with a second circuit which includes a pair of arc electrodes of the material to be colloidalised, immersed in the dispersion medium. In the example shown, the source of energy V is connected in a circuit consisting of inductances L_1L_2 and capacities C_1C_2, the values of which may be varied to vary the frequency. This circuit is electrically coupled with a circuit which includes

the electrodes E_1E_2, *e.g.*, of silver, forming an arc A which is immersed in the dispersion medium M, *e.g.*, water. The silver is thus caused to disintegrate at very high frequency into the water. Various colloidal solutions of the same metal may be obtained, depending on the size of the particles in the solution and their concentration. These different solutions are obtained by varying the current, voltage, frequency, length, time of maintenance, size of electrodes and nature of the electrodes with respect to the arc, and also the nature of the dispersion medium. Since only the substance dispersed and the medium are present, the colloidal solution produced is purer. These colloidal solutions are exceptionally stable, they require no protective colloid, and do not coagulate on the addition of 1 per cent. of saline solution. The stability of this colloidal solution is such that it may be concentrated by boiling. It is found that to obtain a stable solution and uniformity in the size of particles, the frequency of the oscillating current must lie between 100,000 and 850,000 per second. It is also found that the P_H value of the distilled water used must be between 5·8 and 6·2 to ensure stability. These colloidal solutions are very powerful bactericides, and as an example, 1 cc. of colloidal silver solution containing 0·04 per cent. silver will destroy 1,000,000,000 bacteria per cc. in five minutes. The



212,442

production of these solutions and their application for medical purposes is described in detail. Any specific size of particles required in this solution may be obtained by passing it through porcelain filters at high pressure.

212,453. Purifying or Softening Water by means of Base-Exchanging Compounds, and Regenerating the Compounds when Spent. T. P. Hilditch, Birchdene, Cross Lane, Grappenhall, Cheshire. H. J. Wheaton, 5, Walton New Road, Lower Walton, near Warrington, and Joseph Crosfield and Sons, Ltd., Warrington, Lancs. Application date, May 10, 1923.

The base-exchanging compound is contained in a vessel having means for passing the water to be treated and the regenerated solution through it. The inlet and outlet for the water and for the regenerating solution are arranged so that the water and solution are distributed over the whole transverse sectional area of the vessel, at the top and bottom. The perforations or jets are directed towards the top and bottom of the vessel, so that the water and solution enter and leave the vessel in directions opposite to those in which they are to pass, or have passed, through the base-exchanging compound. It is found that this reversal of flow at the ends of the vessel causes a better and more even distribution of the liquid over the base-exchanging material than if the perforations or jets are arranged to face each other. The lower layer of base-exchanging compound may be sufficiently coarse to avoid the necessity for a supporting layer of inert material, and the main body of base-exchanging compound may be of finer particles supported on this layer.

212,461. Extraction of Oils and Fats from Oil or Fat Bearing Material. J. Lewis, 48, The Avenue, Brondesbury Park, London. Application date, May 22, 1923.

This process is for extracting oil or fat from seeds, copra, fish, and animal matter, without the use of a press. The substance is first passed through a disintegrator, and then into a centrifugal separator, where it is treated with wet or saturated steam while the separator is rotating at about 800 revs. per minute. The steam is preferably at 250°–300° F., and the oil or fat is extracted by the combined centrifugal action, mechanical action of the steam jets, and the heat.

Note.—Abstracts of the following specifications, which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: 188,667 (Naamlooze Vennootschap Algemeene Nôrit Maatschappij) relating to a process of purifying liquids, see Vol. VIII., p. 102; 199,032 (C. Urfer) relating to a process for the synthetic production of ammonia, see Vol. IX., p. 180; 206,158 (Soc. des Etablissements Barbet) relating to apparatus for the catalytic production of formaldehyde, see Vol. X., p. 19; 209,389 (E. von Boyen) relating to the purification of brown coal wax, see Vol. X., p. 251.

International Specifications not yet Accepted

210,409. Converting Fertilisers into a Non-caking Condition. Norsk Hydro-Elektrisk Kraelstofaktieselskab, 7, Solligatan, Christiania. International Convention date, January 23, 1923.

Fertilisers or other materials are pressed between smooth water-cooled rollers which convert them into thin hard sheaves with smooth surfaces which do not cake together.

210,462. Dyeing. Chemische Fabrik Griesheim Elektron, Frankfurt-on-Main, Germany. International Convention date, January 29, 1923.

Cotton is impregnated with 2:3-oxynaphthoic-β-naphthalide by short handling in a concentrated solution. The cotton is then developed with a solution of a diazo compound without first centrifuging. If prolonged handling is employed, sodium chloride, sulphate, or acetate, which do not precipitate the β-naphthalide, are added. Examples are given in which the developing solution is 4-nitro-2-amino-toluene or 4-nitro-2-amino-phenetole, giving red shades, and *o*-phenetole-azo-α-naphthylamine giving black shades.

210,463. Dyes. Durand and Huguenin Akt.-Ges., Basle, Switzerland. International Convention date, January 29, 1923. Addition to 208,162.

Specification 208,162 (see The Chemical Age, Vol. X, p. 175) describes the production of azo dyestuffs from benzidine or tolidine-2 : 2^1-disulphonic acid and xylenol carboxylic acid (OH : COOH : CH_3 : CH_3=1 : 2 : 3 : 5). The xylenol carboxylic acid is now replaced by *m*-cresotinic acid, yielding golden yellow shades with a chrome-mordant on cotton, and yellow shades on wool when after-chromed.

210,465. 2 : 1-Thionaphthisatin. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, January 29, 1923.

2 : 1-naphthioindoxyl is converted into 2 : 1-thionaphthisatin by replacing the hydrogen atoms of the methylene group by a radicle which is readily eliminated, or by a halogen, and treating with a saponifying agent such as an inorganic or organic acid. In examples, the naphthioindoxyl is condensed with *p*-nitroso-dimethylaniline and the 2 : 1-thionaphthisatin-2-(4^1-dimethylamino)-anil is hydrolysed by sulphuric acid, or the naphthioindoxyl is treated with bromine in glacial acetic acid and the 2-dibromide hydrolysed.

210,734. Sulphur Burners. Metallbank und Metallurgische-Ges., 45, Bockenheimer Anlage, Frankfurt-on-Main, Germany. International Convention date, January 31, 1923.

The combustion chamber of a sulphur burner is provided with two outlet flues at the top, both controlled by dampers. One flue leads the hot gases below a sulphur melting vessel, so that their heat is utilised, and the other flue leads directly away from the burner.

210,742. Purifying Anthracene. L. Weil, 80, Schlüterstrasse, Hamburg, and Chemische Fabrik in Billwärder vorm. Hell and Sthamer Akt.-Ges., 28, Billbrookdeich, Billbrook, Hamburg. International Convention date, January 30, 1923. Addition to 172,966.

Specification 172,966 (see The Chemical Age, Vol. VI, p. 210) describes the production of anthracene by distilling with petroleum hydrocarbons of boiling point 260°–315° C. In this invention, the vapours of anthracene, carbazole and petroleum hydrocarbons are passed through fused potash at 260°–300° C., or over granulated potash at 150°–160° C. Anthracene crystallises from the distillate, and the potassium carbazole is boiled with water to obtain carbazole. The carbazole may be purified by distillation or crystallisation.

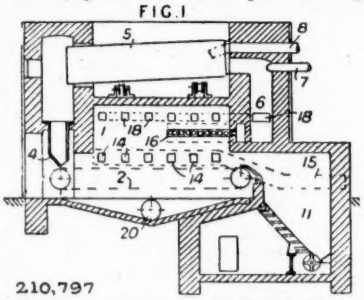
210,761. DEHYDRATING ALCOHOL. Soc. Ricard, Allenet, et Cie., Distilleries des Deux-Sèvres, Melle, Deux-Sèvres, France. International Convention date, February 3, 1923.

Alcohol is mixed with substances non-miscible with water such as hydrocarbons and chlorinated or nitrated derivatives, aldehydes, ketones, esters, ethers, etc., and then treated with a dehydrating agent such as sodium or potassium carbonate, iron, sodium or manganese sulphate, magnesium chloride, quicklime or calcium carbide.

210,797. DRY DISTILLATION. Syndikat für Gasforschung, 129, Friedrichstrasse, Berlin. (Assignees of Estnische Steinöl-Akt.-Ges., Reval, Esthonia. International Convention date, February 1, 1923.

Material is passed through a conduit 8 to a drum 5, where it is dried by hot gases from a flue 6 and air from a pipe 7. The dried material is discharged on to an endless conveyor 2 which moves it through the distillation chamber 1 to a producer 11. The producer gas passes through a conduit 15 to openings 14 and 20 into the charge to distil it, but part of the gas is burned

FIG. 1



210,797

by air supplied through nozzles 16 so that a hot zone is formed above the material and radiates heat to it. The combustion products pass through openings 18 to a flue 6, and the distilled gases to an outlet 20.

211,108. MORDANTS AND TANNING AGENTS. Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. International Convention date, February 9, 1923. Addition to 173,313. (See THE CHEMICAL AGE, Vol. VI, p. 145.)

Sulphurised phenol derivatives, which may be obtained by treating phenol with sulphur chloride, are converted into thiosulphonic acids by treating with an alkali sulphite in the presence of oxygen, air, or hydrogen peroxide. The products are mordants for basic dyestuffs, and are tanning agents. In an example, phenol is boiled with sulphur and caustic soda solution, the viscous product is diluted, neutral sodium sulphite is added, and air is passed through for several days at 70°–80° C. In another example, the product from *o*-chlorphenol, caustic soda and sulphur is treated with neutral sulphite in a current of air. Phenols such as *o*-, *m*-, and *p*-cresol, crude cresol, *p*-chlorphenol, and oxybenzoic acids may also be used.

211,120. DYES. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, February 9, 1923. Addition to 189,782. (See THE CHEMICAL AGE, Vol. VIII, p. 152.)

2 : 1–thionaphthisatin in the form of the 2–(4'-dimethylamino)-anil is condensed with oxythionaphthene to obtain a dyestuff dyeing cotton in bordeaux shades from a yellow vat.

211,125. ACETYLENE AND HYDROGEN. F. Gros, 124, Rue de Provence, Paris. International Convention date, February 8, 1923.

Gas containing methane or ethylene, such as the distillation gas from coal, lignite, coke, wood, from which components other than methane have been removed, methane produced by the catalytic reaction of hydrogen and carbon monoxide, natural gas, or gas obtained by cracking mineral or vegetable oils, may be subjected to the action of electric sparks to obtain acetylene and hydrogen. The sparking takes places in a tube, between conductors of platinum, nickel or aluminium, or copper coated with platinum or nickel. The acetylene is separated by liquefying, dissolving under pressure in acetone, polymerising under heat, or converting into acetaldehyde. Benzene and tarry hydrocarbons are removed, and the hydrogen obtained may be used for the synthesis of ammonia, or the production of methane from water-gas. The methane may then be used as the starting material. Examples of the process, using lighting-gas, are given.

LATEST NOTIFICATIONS.

213,526. Manufacture of fuel alcohol, and apparatus therefor. Henneberg, G., and Charpentier, M. March 27, 1923.

213,531. Purification of minerals and salts. Soc. Chimique de la Grande Paroisse (Azote et Produits Chimiques). March 29, 1923.

213,538. Solvent recovery plant. Geisel, Dr. E. March 28, 1923.

213,561. Method and mechanism for dehydrating minerals. Wade, W. R., and New York Zinc Co., Inc. March 28, 1923.

213,567. Manufacture of condensation products from urea or its derivatives and formaldehyde. Pollak, Dr. F. March 31, 1923.

213,571. Process of manufacturing nitric acid and nitric acid salts, a catalyst suitable for carrying out the said process, and the process of manufacturing the said catalyst. Kassner, Dr. G. March 31, 1923.

213,599. Process of producing inorganic and organic acids. Meyerhofer, A. F. March 28, 1923.

Specifications Accepted, with Date of Application

190,114. Acid H (amino-naphthol-disulphonic-1 : 8 : 3 : 6). G. Poma and G. Pellegrini. December 12, 1921.

197,903. Ores containing iron or other metal, Treatment of. W. J. Mellersh-Jackson. (*Soc. Anon. J. Cockerill*). October 20, 1922.

212,961. Rotary retorts, kilns, dryers or the like. H. Nielsen and B. Laing. November 21, 1922.

212,970. Organic compounds, Manufacture of—by reactions involving replacement of substituent atoms or groups with liquid reagents. W. V. Shannan, N.E. Siderfin, W. G. Adam, and Gas Light and Coke Co. December 16, 1922.

212,978. Grinding mills. W. H. Reynolds, E. S. Brewin, and W. M. Dickin. December 18, 1922.

212,990. Oxidised fatty acids from non-oxidised fatty acids, Process of separating. G. Petroff. December 20, 1922.

213,040. Carbonisation of fuel such as coal, lignite, and the like. W. E. Davies. January 18, 1923.

213,046. Petroleum or other mineral oil, Method and apparatus for destructively distilling—from oil shales, bituminous coal, and other hydrocarbonaceous material. A. Stalli. January 22, 1923.

213,088. Acetate of alumina, Manufacture of—by electrolysis. H. Cruse. February 26, 1923.

213,100. Carbonaceous material, Apparatus for distilling. W. P. Perry. March 12, 1923.

213,195. Charcoal, Manufacture of. A. G. Bloxam. (*Akt.-Ges. für Anilin Fabrikation.*) September 25, 1923.

Applications for Patents

Blair, Campbell, and McLean, Ltd., and Moeth, C. W. Dehydration of alcohol. 8,630. April 5.

British Celanese, Ltd., and Ellis, G. H. Treatment of products, etc., made with cellulose derivatives. 8,562. April 4.

British Dyestuffs Corporation, Ltd., and Hodgson, H. E. Manufacture of azo dyestuffs. 8,268. April 1.

Calvert, G. Rubber compounds. 8,080. March 31.

Crozier, R. H. Fractionation of hydrocarbon oils, etc. 8,575. April 4.

Du Pont de Nemours and Co., E.I., and Nobel Industries, Ltd. Presses for drawing metal articles. 8,277. April 1.

Fabrique de Soie Artificielle de Tubize Soc. Anon. Production of concentrated acetic acid from aqueous solutions thereof. 8,375. April 2. (Germany, April 4, 1923.)

Farbwerke vorm. Meister, Lucius, and Brüning. Manufacture of complex metallic arsenobenzene compounds. 8,632. April 5. (Germany, April 9, 1923.)

Grasselli Chemical Co., and Marks, E. C. R. Heating and distilling liquids 8,172. March 31.

Green, R. Manufacture of cellulose acetate. 8,435. April 3.

Heyl, G. E. Production of greases, etc., from oil, shale, coal, etc. 8,098. March 31.

Klopstock, H., and Neumann, W. Production of potassium carbonate. 8,245. April 1.

Leach, H., Maypole Margarine Works, Ltd., and Thornley, T Apparatus for manufacture of margarine, etc. 8,367. April 2.

Magnetic Pigment Co., and Fairweather, H. G. C. Preparing pigments. 8,091. March 31.

Sauer, J. N. A. Manufacture of decolorizing carbon. 8,655, 8,656. April 5.

Steffen, C. Continuous deposition of tricalcium saccharate. 8,271. April 1.

Patents Court Case

AN application has been made under Section 24 of the Patents and Designs Acts 1907 and 1919, for the following patent to be indorsed " Licences of Right " :—

159,086 (S. E. Sieurin) relating to a process for producing aluminium oxide from aluminium chloride.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, April 10, 1924.

TRADE has been a little more active this week despite the approaching holiday. Prices on the whole continue firm and Continental values are in many cases higher than those quoted here.

Export inquiry continues slow and uninteresting.

General Chemicals

ACETONE.—The value is maintained, and a moderate business has been transacted.

ACID ACETIC has steadied and the recent slight fall appears to be only temporary.

ACID CITRIC.—Unchanged.

ACID FORMIC continues scarce and firm.

ACID LACTIC is a shade easier, but the demand is good.

ACID OXALIC.—Price is without change and in fair inquiry.

ACID TARTARIC is in fair request and price is a shade firmer.

BARIUM CHLORIDE.—Quite a good business has been transacted at current values.

BLEACHING POWDER.—Unchanged.

CREAM OF TARTAR is active and the price is firm.

FORMALDEHYDE maintains its value, and the market has an upward tendency.

LEAD ACETATE has firmed up again, and a good business is reported.

METHYL ALCOHOL continues scarce and the price is nominally without change.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.

POTASSIUM PERMANGANATE is only in small request and price inclined to be easy.

POTASSIUM PRUSSIATE.—Price is firm although the demand is only moderate.

SODIUM ACETATE continues scarce and inclined to go higher.

SODIUM BICHROMATE.—Unchanged.

SODIUM HYPOSULPHITE.—A fair business is reported at British makers' figures.

SODIUM NITRITE.—Scarce and firm.

SODIUM PHOSPHATE.—Only in moderate request without change in value.

SODIUM PRUSSIATE continues in small request and price inclined to be easy in the absence of any strong export buying.

SODIUM SULPHIDE.—Unchanged.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID has been less active. English make is offered freely, and is in buyers' favour. Higher prices are, however, asked for the best Continental brands.

ACETANILID is cheaper.

ACID SALICYLIC is weak.

BROMIDES are steady, the general outlook being firm. A few second-hand parcels of Potassium Granular are offering at cut prices.

CALCIUM LACTATE is lower, English makers competing keenly for the business.

HEXAMINE is irregular.

MERCURIALS have advanced, and may go higher in sympathy with Quicksilver.

PHENACETIN.—A cheap parcel recently imported has been forced for sale below the general market price.

PHENOLPHTHALEIN.—Lack of demand has resulted in some cutting by weak holders.

RESORCINE is steadier.

SODA SALICYLATE is slow, and in buyers' favour.

SODA BENZOATE is easier.

VANILLIN is very firm, Continental makers having substantially advanced their quotations.

Coal Tar Intermediates

Trade in this market during the last week continues on quiet lines without much change in prices.

ALPHA NAPHTHOL.—A small export inquiry has been received.

ALPHA NAPHTHYLAMINE.—Some fair business has been placed and it is still of interest for export account.

ANILINE OIL.—Some home trade business has been placed, the price being unchanged.

ANILINE SALT has been of less interest than of late.

BENZIDINE BASE is quieter with a fair inquiry.

BETA NAPHTHOL has been inquired for on export account, and is without change in value.

DIMETHYLANILINE is without change in value, with fair business passing.

DIPHENYLAMINE has been of interest for home trade, the price being without change.

"H" ACID has been inquired for on both home and export account.

NITRO BENZOL.—The usual home trade business has been received.

PARANITRANILINE.—Export inquiries have been received, and the price is without change.

"R" SALT is without special interest.

RESORCINE has been quieter, and continues in scarce supply.

XYLIDINE is of interest for export markets.

Coal Tar Products

The market generally in coal tar products is quietly steady, without much fresh business passing.

90 PER CENT. BENZOL is steady at 1s. 6½d. to 1s. 7d. per gallon on rails.

PURE BENZOL is also stationary at 1s. 11d. per gallon on rails.

CREOSOTE OIL is unchanged from last week, at 7¾d. per gallon on rails in the North, while the price in London is from 9d. to 9¼d. per gallon.

CRESYLIC ACID is firm, the pale quality 97/99 per cent. being worth about 2s. 1d. to 2s. 2d. per gallon on rails, while the dark quality 95/97 per cent. is quoted at 1s. 9d. to 1s. 10d. per gallon on rails.

SOLVENT NAPHTHA is firm at 1s. 3d. per gallon.

HEAVY NAPHTHA is quoted at 1s. 2d. to 1s. 3d. per gallon.

NAPHTHALENES are dull, the low grade qualities being worth £7 to £7 10s. per ton, 74/76 melting point from £8 to £8 10s. per ton, and 76/78 quality from £9 to £9 10s. per ton.

PITCH is dull, and to-day's value is 55s. to 60s. per ton f.o.b. main ports.

Sulphate of Ammonia

The position is unchanged.

Sulphuric Acid from Zinc Ores

THE possibility of new sources of sulphur compounds for sulphuric acid manufacture being available next year, was indicated in the following statement made at the recent dinner of the Institution of Mining and Metallurgy by Mr. W. S. Robinson, a director of the National Smelting Co., Electrolytic Zinc Co. of Australasia, Broken Hill Associated Smelters, and Zinc Producers' Association Pty., Ltd., and a member of the Burmah Corporation Advisory Committee. He pointed out that since 1906 when the commercial production of zinc concentrates may be said to have started at Broken Hill, N.S.W., about 14,000,000 tons of zincferous residues have been treated. From them 4,000,000 tons of zinc concentrates were produced, representing nearly 1,500,000 tons of spelter and 4,000,000 tons of sulphuric acid. Nearly 75 per cent. of this vast quantity went to the continent of Europe for treatment in Belgium, France, Germany, and Holland. After about the middle of 1925 the Continental trade would entirely cease and all concentrates would be treated only in the British Empire. He believed that as a result of this policy a new era would be opened not only for the British mineral and metal industries but for the chemical and allied trades also.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	105	0	0	to	107	10	0
Acid, Acetic, glacial, 99–100%	ton	73	0	0	to	74	0	0
Acetic, 80% pure	ton	50	0	0	to	51	0	0
Acetic, 40% pure	ton	26	0	0	to	27	0	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7½	to	0	0	8
Citric	lb.	0	1	5½	to	0	1	6
Formic, 85%	ton	64	0	0	to	66	0	0
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	37	0	0	to	39	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	23	0	0	to	25	0	0
Oxalic	lb.	0	0	5½	to	0	0	5¾
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9½	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	0	to	0	2	3
Tartaric	lb.	0	1	1½	to	0	1	2
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	23	0	0	to	24	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	7	10	0	to	8	10	0
Sulphate, 17–18%	ton	8	10	0	to	9	10	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	30	0	0	to	32	0	0
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	32	0	0	to	33	0	0
Nitrate (pure)	ton	40	0	0	to	45	0	0
Phosphate	ton	63	0	0	to	65	0	0
Sulphocyanide, commercial 90%	lb.	0	1	5	to	0	1	6
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	65	0	0	to	66	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	14	0	0	to	14	10	0
Nitrate	ton	37	0	0	to	40	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	0	0	to	10	10	0
Borax crystals, commercial	ton	25	0	0	to		—	
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	20	0	0	to	21	0	0
Carbide	ton	13	0	0	to	13	10	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	80	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	24	10	0	to	25	0	0
Cream Tartar, 98–100%	ton	80	0	0	to	85	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	65	0	0	to	66	0	0
Formusol (Rongalite)	lb.	0	1	11	to	0	2	0
Glauber salts commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal	0	2	0	to	0	2	1
Iron perchloride	ton	20	0	0	to	22	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	49	10	0	to	50	0	0
Carbonate (White Lead)	ton	50	0	0	to	52	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	50	0	0	to	51	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	4	0	0	to	4	5	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	9	0	0	to	10	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	48	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	85	0	0	to	86	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate, double salt	ton	37	0	0	to	38	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	5¾	to		—	
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to		—	
Metabisulphite, 50–52%	ton	63	0	0	to	65	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	8	to	0	0	8½
Prussiate, red	lb.	0	1	10	to	0	2	0
Prussiate, yellow	lb.	0	0	8½	to	0	0	9
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	2	15	0	to		—	
Seconds	cwt.	2	17	6	to		—	
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to		—	
Bisulphite, 60–62%	ton	20	0	0	to	22	0	0
Chlorate	lb.	0	0	2¾	to	0	0	3
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	0	0	to	10	10	0
Nitrite, 96–98%	ton	29	0	0	to	30	0	0
Phosphate, crystal	ton	15	10	0	to	16	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	5½	to	0	0	6
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62%	ton	15	0	0	to	16	10	0
Sulphite, cryst.	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	1	0	to	0	1	1
Tin perchloride, 33%	lb.	0	1	4	to	0	1	5
Perchloride, solid	lb.	0	1	5	to	0	1	6
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	10
Zinc chloride 102° Tw.	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	15	0	0	to	16	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	6	to	0	3	10
Acetanilid	lb.	0	2	6	to	0	2	9
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	1	10	to	0	2	0
Tannic, leviss	lb.	0	3	0	to	0	3	3
Amidol	lb.	0	8	6	to	0	9	0
Amidopyrin	lb.	0	13	6	to	0	14	0
Ammon ichthosulphonate	lb.	0	1	10	to	0	2	0
Barbitone	lb.	0	16	0	to	0	16	6
Beta naphthol resublimed	lb.	0	3	3	to	0	3	9
Bromide of ammonia	lb.	0	0	10	to	0	1	0½
Potash	lb.	0	0	8	to	0	0	8
Soda	lb.	0	0	8½	to	0	0	9
Caffeine, pure	lb.	0	12	0	to	0	12	6
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	8	to	0	1	10
Calomel	lb.	0	4	0	to	0	4	3
Chloral hydrate	lb.	0	3	10	to	0	4	0
Cocaine alkaloid	oz.	1	1	0	to	1	2	6
Hydrochloride	oz.	0	17	0	to	0	17	6
Corrosive sublimate	lb.	0	3	5	to	0	3	7
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	2	0	to	0	2	2
B.P. (75–80% eucalyptol)	lb.	0	2	1	to	0	2	3
Guaiacol carbonate	lb.	0	12	9	to	0	13	0
Liquid	lb.	0	11	6	to	0	12	0
Pure crystals	lb.	0	12	6	to	0	13	0
Hexamine	lb.	0	3	9	to	0	4	0
Hydroquinone	lb.	0	4	6	to	0	5	0
Lanoline anhydrous	lb.	0	0	7	to	0	0	6
Lecithin ex ovo	lb.	1	5	0	to	1	7	6
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	9	to	0	3	0
Metol	lb.	0	10	6	to	0	11	6
Milk sugar	cwt.	4	0	0	to	4	5	0
Paraldehyde	lb.	0	1	5	to	0	1	7
Phenacetin	lb.	0	6	9	to	0	7	0
Phenazone	lb.	0	7	9	to	0	8	3
Phenolphthalein	lb.	0	7	3	to	0	7	6
Potassium sulpho guaiacolate	lb.	0	6	3	to	0	6	9
Quinine sulphate, B.P.	oz.	0	2	3	to		—	

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	6	to	0	6	0
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	9	to	0	3	0
Salol	lb.	0	4	0	to	0	4	3
Soda Benzoate	lb.	0	3	0	to	0	3	3
Sulphonal	lb.	0	17	6	to	0	18	3
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	3
Soda salicylate	lb	0	8	6	to	0	9	0
Vanillin	lb.	1	5	0	to	1	7	6

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	1	9	to	0	2	0
Refined	lb.	0	2	3	to	0	2	6
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	8½	to	0	0	8½
Salts	lb.	0	0	9	to	0	0	9½
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	9	to	0	3	0
Benzidine, base	lb.	0	4	4	to	0	4	7
Sulphate	lb.	0	3	4	to	0	3	7
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Crocein Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	10	to	0	0	11
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	3	to	0	1	4
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	8	to	0	2	10
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	4	3	to	0	4	6
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	4	to	0	2	6
Naphthionate of Soda	lb.	0	2	4	to	0	2	6
Naphthylamine-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	6	to	0	2	8
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	9	to	0	0	10
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	c.i.f. 2/6 spot	0	2	8
Bay		0	10	6
Bergamot		0	17	0
Cajuput		0	3	3
Camphor, white	per cwt.	3	15	0
Brown	„	3	15	0
Cassia	easier, c.i.f. 7/9, spot	0	8	6
Cedarwood		0	1	6
Citronella (Ceylon)	easier, c.i.f. 3/3, spot	0	3	6
(Java)	firm, c.i.f. 4/6, spot	0	4	9
Clove		0	8	6
Eucalyptus	easier	0	2	2
Geranium Bourbon	dearer	1	13	0
Lavender		1	5	0
Lavender Spike		0	6	0
Lemon		0	3	3
Lemongrass	per oz.	0	0	2½
Lime (distilled)	firm	0	4	9

		£	s.	d.
Orange sweet (Sicilian)		0	12	9
(West Indian)		0	9	6
Palmarosa		0	18	0
Peppermint (American)		0	19	0
Mint (dementholised Japanese)	dearer, spot 18/-, forward	1	0	0
Patchouli		1	2	6
Otto of Rose	per oz.	1	15	0
Rosemary	cheaper	0	1	9
Sandalwood		1	5	0
Sassafras		0	10	6
Thyme	2/6 to	0	8	0

Synthetics.				
Benzyl acetate	per lb.	0	3	6
Benzoate	„	0	3	6
Citral	„	0	10	0
Coumarine	„	1	0	0
Heliotropine	„	0	8	0
Ionone	„	1	5	0
Linalyl acetate	„	1	2	6
Methyl salicylate	easier „	0	2	6
Musk xylol	„	1	0	0
Terpeniol	„	0	2	9

The Kinema in Industry

B.A.C.'s Exhibition of Industrial Films in Liverpool

THE educational possibilities of the kinema film (a correspondent writes) were convincingly demonstrated at an exhibition of industrial kinema films arranged by the Liverpool Section of the British Association of Chemists at Messrs. Pathé Freres' establishment on Friday, April 4, when a packed house spent an instructive evening, following "at a safe distance" the intricacies of the alkali and heavy chemical industries and the distillation of coal-tar, as illustrated by spools loaned by the Association of British Chemical Manufacturers. Besides being depicted by actual plant and staffs in operation, a large number of processes were explained by working diagrams—that is, by diagrams which actually "worked," the operation of, say, distillation or of electrolysis being thus rendered intelligible to the lay mind.

The film, "The Cement Age," loaned by the Portland Cement Manufacturers' Association, was next screened, but the operations here, being more of the purely mechanical type, there was less scope for the imagination of the "producer." Nevertheless a vivid impression was created of the large part played by Portland cement in industrial and commercial enterprises by reason of its increasing use in constructional work and road-making.

The Chairman, Mr. A. Merrick, B.Sc., during an interval, described the present activities of the British Association of Chemists and the various objects for which it had been founded. The ensuing portion of the programme was then projected on to the screen. This consisted of four reels entitled "The Conquest of Oil," lent by the Anglo-American Oil Company, and illustrative of the petroleum industry right from the sinking of the well to the delivery of the finished products to the customer, the processes in many cases being visualised by means of ingenious "working diagrams." One saw how the crude mineral oil gushed forth from the earth and was afterwards purified and finally separated by distillation into petrol, paraffin, lubricating oil and fuel oil. The English works of the company were also shown, as well as the latest machinery for making tubs, petrol cans, etc., and automatically delivering oil in measured quantities at the kerb-side.

Trade Catalogues for Newfoundland

THE Imperial Trade Correspondent at St. John's, Newfoundland, has drawn attention to the fact that many trade catalogues from exporters in the United Kingdom arrive in Newfoundland with Canadian Customs stamps attached for the pre-payment of the Customs duty on the catalogues. Exporters should bear in mind that the Customs Tariffs of Canada and Newfoundland are distinct and independent, and catalogues arriving in Newfoundland with Canadian Customs stamps attached are not regarded as duty-paid goods in Newfoundland, and are, in consequence, sent to the Dead Letter Office.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, April 10, 1924.

THE improvement in business recorded last week has not been maintained, the heavy chemical market being very quiet during the past week. The few inquiries received have been in nearly all cases for small quantities.

Continental quotations still continue to advance, prices for home manufactured chemicals being generally unchanged.

Industrial Chemicals

ACID ACETIC.—Unchanged. Glacial 98/100%, £62 to £70 per ton; 80% pure, £51 to £53 per ton; 80% technical, £47 to £50 per ton, all packed in casks, delivered c.i.f. U.K. port, duty free. Moderate inquiry for export.

ACID BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—In little demand, and price inclined to be lower, now quoted 8d. per lb., carriage paid.

ACID CITRIC, B. P. CRYSTALS.—Moderate inquiry and price higher. Now quoted 1s. 6d. to 1s. 6¼d. per lb., less 5 per cent. carriage paid.

ACID FORMIC, 85%.—Spot material available at about £64 to £65 per ton, ex store. Offered for forward delivery at £62 per ton, c.i.f. U.K. port.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Inquiry very moderate. Nominally 5½d. per lb., ex store. Offered for early delivery at 5d. per lb., c.i.f. U.K. port.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Unchanged at 1s. 1½d. per lb., less 5 per cent. ex store, quoted 1s. 1d. per lb., less 5 per cent. ex wharf, early shipment.

ALUMINA SULPHATE, 17/18% IRON FREE.—Spot lots now quoted £8 5s. per ton, ex store.

ALUM, CHROME.—Potash chrome alum quoted about £27 per ton, ex station. Ammonium chrome alum about £20 to £21 per ton, ex store. Moderate inquiry for export.

ALUM POTASH (LUMP).—Spot lots unchanged at about £10 15s. per ton, ex store. Offered from the Continent at about £9 10s. per ton, c.i.f. U.K. port.

AMMONIA, ANHYDROUS.—Unchanged at about 1s. 5½d. per lb., ex station, prompt delivery.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K.

AMMONIA LIQUID 880°.—Unchanged at 2½d. to 3d. per lb., delivered, according to quantity. Containers extra.

AMMONIA MURIATE.—Grey galvanisers quality on offer at £30 per ton, ex station, or delivered f.o.b. U. K. port. Fine white crystals offered from the Continent at about £25 15s. per ton c.i.f. U.K. port.

AMMONIA SULPHATE.—25¼%, £13 12s. per ton; 25¾% quality, £14 15s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Offered for early delivery at £63 per ton, ex wharf. Spot lots now quoted £66 10s. per ton, ex store.

BARIUM CARBONATE, 98/100%.—Offered from the Continent at £11 10s. per ton, c.i.f. U.K. port, prompt shipment.

BARIUM CHLORIDE, 98/100%.—English material unchanged at about £14 5s. per ton, ex store. Continental quoted £13 5s. per ton, c.i.f. U.K. port.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental about £5 per ton, c.i.f. U. K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts, 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d per ton, ex station. Continental slightly cheaper at about £4 7s. 6d. per, c.i.f. U.K. port.

COPPERAS, GREEN.—Moderate inquiry for export. Quoted £2 5s. per ton, f.o.b. U.K. port in bulk, about £3 5s. to £3 10s. per ton, in casks.

COPPER SULPHATE.—Moderate inquiry quoted £25 per ton, ex store. Spot lots of Continental material on offer at slightly less.

FORMALDEHYDE 40%.—Spot lots now quoted £63 to £64 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental on offer at £3 2s. 6d. per ton, c.i.f. U.K. port.

LEAD, RED.—Continental material now on offer at about £41 per ton, ex store, spot delivery.

LEAD, WHITE.—Quoted £42 per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals on offer at £47 10s. per ton, ex store. Brown, about £46 per ton, ex store. Slightly cheaper quotations from the Continent. White crystals quoted £45 15s. per ton, c.i.f. U.K. port.

MAGNESITE CALCINED.—English ground material offered at £8 per ton, ex station. Moderate inquiry for export.

MAGNESIUM CHLORIDE.—Offered from the Continent at £3 2s. 6d. per ton, c.i.f. U.K. port. Spot material on offer at £3 15s. per ton, ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial quality quoted £5 per ton, ex store. B.P., £6 5s. per ton, ex station, prompt delivery.

POTASH CAUSTIC, 88/92%.—Good inquiry and prices inclined to be higher. Quoted £31 10s. per ton, ex wharf early delivery. Spot lots about £33 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb., delivered.

POTASSIUM CARBONATE.—96/98% quality offered from the Continent at £25 per ton. c.i.f. U.K. port. Spot lots quoted £27 15s. per ton, ex store; 90/94% quality advanced to £23 per ton, c.i.f. U.K. port.

POTASSIUM CHLORATE.—Little inquiry; offered at 3¼d. per lb., ex store, spot delivery.

POTASSIUM NITRATE (SALTPETRE).—Prices for forward delivery advanced to about £27 15s. per ton, c.i.f. U.K. port. Spot lots still available at £31 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 9¼d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—Unchanged at about 8¾d. per lb., f.o.b. U.K. port, or ex station, in little demand.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62% broken, £19 2s. 6d. per ton; 98/99% powdered, £22 15s. per ton. All ex station, spot delivery. Contracts, 20s. per ton less.

SODIUM ACETATE.—Now quoted £25 per ton, ex store. Offered from the Continent at £23 per ton, c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. N.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English makers' prices unchanged at 4½d. per lb., D/d.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material, £10 per ton, ex station. Continental about £9 12s. 6d. per ton, c.i.f. U.K. port. Pea crystals of English manufacture on offer at £14 10s. per ton. ex station.

SODIUM NITRATE.—Refined, 96/98% quality, unchanged at £13 10s. to £13 15s. per ton, f.o.r. or f.o.b. U.K. port.

SODIUM NITRITE, 100%.—Quoted £27 to £28 per ton according to quantity, f.o.b. U.K. port.

SODIUM PRUSSIATE (YELLOW).—Moderate inquiry. Quoted 5d. per lb., ex store. Continental material on offer at about 4¾d. per lb., c.i.f. U.K.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £4 5s. per ton. carriage paid stations. Good export inquiry.

SODIUM SULPHIDE.—60/65% solid, English make, £14 15s. per ton, ex station; broken, £1 per ton more; flake, £2 per ton more. 60/62% offered from the Continent at £13 17s. 6d. per ton, c.i.f. U.K. port; broken, £1 per ton more; 31/34% crystals, English make, £9 2s. 6d. per ton, ex station; 30/32% crystals, Continental make, quoted £9 2s. 6d. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

ZINC CHLORIDE, 98/100%.—Moderate inquiry for export. Now quoted £26 per ton, f.o.b. U.K. port.

ZINC SULPHATE.—English material unchanged at about £13 10s. per ton, ex store. Offered from the Continent at £11 10s. per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Moderate home demand. Price 1s. 5d. per lb., delivered.

BENZIDINE BASE.—Moderate home inquiry. Price 4s. 6d. lb., 100% basis.

CLEVES ACID.—Is now offered at 3s. 5d. per lb., 100% basis.

DINITROBENZENE.—Export inquiry. Price 10½d. per lb., f.o.b.

DINITROTOLUENE.—Export inquiry. Price quoted 11½d. per lb., f.o.b.

G. SALT.—Small home inquiry. Price 3s. 10½d. per lb., 100% basis.

H ACID.—Supplies are offered at 4s. 5d. per lb., 100% basis.

GAMMA ACID.—Small home inquiry. Price 11s. lb., 100% basis, delivered.

MONONITROTOLUENE.—Some export inquiry. Price 9d. lb., drums included, f.o.b.

N.W. ACID.—Home inquiry. Price 5s. 9d. lb., 100% basis.

NAPHTHIONATE OF SODA.—In fair demand. Price 2s. 6d. lb. 100% basis.

NITROBENZENE DISTILLED.—Some export inquiry. Price 6d. lb., f.o.b., drums included.

R SALT.—Good export inquiry. Price 2s. 7d. lb., 100% basis, f.o.b.

TOBIAS ACID.—Some export inquiry. Price 5s. 3d. lb., 100% basis, f.o.b.

TOLUIDINE.—Export inquiry. Price 1s. 6d. lb., drums included, f.o.b.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

SULPHATE OF COPPER FOR FRANCE.—An agent, established in Nantes, is desirous of obtaining the representation of British firms for the sale in France of sulphate of copper. (405.)

CHEMICALS FOR PERU.—A commission agent in Lima, Peru, at present in the United Kingdom, is desirous of securing the representation in Peru of various pharmaceutical chemicals, paper and dyes. (412.)

ZINC DROSS AND ZINC ASHES.—An inquiry has been received at the Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, London, for the names of British importers of zinc dross and zinc ashes.

RAW MATERIALS FOR SOAP AND GLASS WORKS.—H.M. Consul at Liege reports that an important Belgian wholesale co-operative society is desirous of getting in touch with important British firms for the purchase of raw materials for distilleries, breweries, and soap and glass works. Ref. No. 22606/F.W./G.C./2.

No. 1 GAS-HOUSE PITCH.—The office of H.M. Senior Trade Commissioner in Canada at Montreal reports that a local firm is desirous of receiving quotations from U.K. firms for 7 oz. and 10 oz. tarred rag felt for roofing and No. 1 gas-house pitch. Ref. No. 13465/E.D/M.C./(2).

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, April 10, 1924.

THE movement of chemicals here continues on quiet lines and the general position is little changed from that of recent weeks. The major portion of the home trade passing is still for prompt or early delivery. Forward transactions are on a restricted scale. What is needed in this centre to give a real fillip to the trade in heavy chemicals is a definite improvement in the cotton textile industry. Prices still have an easy tendency in the case of one or two lines but, generally speaking, there have been very few further concessions compared with last week.

Heavy Chemicals

Nitrite of soda continues in rather short supply and values are firm at £28 to £28 10s. per ton. The demand for bleaching powder is quieter; prices, however, are unchanged at £10 per ton. Soda crystals are steady and fairly active at £5 5s. per ton. Sodium sulphide continues quiet and easy at £14 15s. per ton for 60–65 per cent. concentrated solid and £9 5s. per ton for crystals. Saltcake continues steady and in moderate inquiry for export; home trade is rather quiet at £4 10s. to £4 15s. per ton. Hyposulphite of soda is only moderately active at £15 per ton for photographic crystals and £9 15s. for commercial. Prussiate of soda is dull and values are weak, to-days quotations varying from 4¾d. to 5d. per lb. Alkali, 58 per cent. material, is steady at £6 15s. per ton; both home and foreign demand for this article is rather good. Glauber salts are quiet but unchanged from last week at £3 10s. per ton. Phosphate of soda is offering at £13 10s. per ton, but in this case, also, the demand is only on moderate lines. Bichromate of soda is steady and meets with a fair enquiry at 4½d. per lb. Caustic soda is in quietly steady demand both for home users and for shipment; values are steady and range from £16 17s. 6d. for 60 per cent. strength to £19 7s. 6d. per ton for 76—77 per cent. Chlorate of soda is about unchanged at 2½d. to 2¾d. per lb., but little improvement can be reported.

Bicarbonate of soda is steady and in quiet demand at £10 10s. per ton. Acetate of soda is quoted at £24 per ton; only moderate quantities are being called for.

Values of caustic potash and carbonate of potash are less firm than they have been, and the demand is quieter; 90 per cent. caustic is quoted at £29 to £30 per ton, and carbonate at round £24 10s. Permanganate of potash is fairly steady at 7¾d. to 8¼d. per lb., though business is only of moderate dimensions. Yellow prussiate of potash is a shade cheaper at 8¼d. per lb. Chlorate of potash is steadier at 2¾d. to 3d. per lb.; buying pressure, however, is not strong. Bichromate of potash continues to meet with a fairly active enquiry at 5¾d. per lb.

The demand for arsenic is rather quiet and values are on the easy side, owing to offers of cheaper foreign material; white powdered, Cornish makes, is now quoted at about £63 per ton, Manchester. Sulphate of copper is not very active, though quotations are rather steadier at £24 10s. to £25 per ton, f.o.b. Commercial Epsom salts are only in moderate demand, but prices are maintained at £4 10s. per ton for British makes; magnesium sulphate, B.P. quality, is still quoted at £6 10s. per ton. Grey acetate of lime is quiet at about £20 per ton; brown is steady at £14 10s. to £15 per ton. Acetate of lead is maintained at £49 to £50 per ton for white and round £47 for brown. Nitrate of lead is steady and in moderate inquiry at £45 to £46 per ton.

Acids and Tar Products

Tartaric acid is in moderate inquiry at 1s. 1½d. to 1s. 2d. per lb. Citric acid is steady at 1s. 5½d. per lb. Acetic acid is firm and in fair request at £47 10s. per ton for 80 per cent. technical and £70 for glacial. Oxalic acid keeps quiet at 5¼d. to 5½d. per lb.

Most of the coal tar products are inactive. Pitch is easy at about £3 per ton, f.o.b., Manchester. Carbolic acid is quiet with crystal quoted at about 8d. per lb. and crude at round 2s. 3d. per gallon. Solvent naphtha is firm and in moderate demand at 1s. 5d. per gallon. Creosote oil is offering at 8¼d. and still has an easy tendency. Naphthalenes are dull at £16 for refined qualities and £7 and upwards for crude.

Company News

LASTENIA NITRATE CO.—The accounts for the year 1923 show a net profit of £475,363 against £280,861 for the previous year.

WEARDALE LEAD CO.—The directors have declared an interim dividend of 5 per cent., less tax, payable forthwith to holders registered on March 31.

NOBEL INDUSTRIES, LTD.—The transfer books for the 5½ per cent. first mortgage debenture stock will be closed from April 17 to April 30, both days inclusive.

THE WALL PAPER MANUFACTURERS, LTD.—The preference share registers will be closed from April 16 to 30, both days inclusive, for the payment of the half-yearly dividend to February 29 last.

TARAPACA AND TOCOPILLA NITRATE CO., LTD.—A dividend has been declared at the rate of 12½ per cent., less tax, in respect of the year 1923. The annual general meeting will be held on May 19.

ABERTHAW AND BRISTOL CHANNEL PORTLAND CEMENT MANUFACTURERS, LTD.—A second interim dividend of 1s. 6d. per share is announced on the ordinary shares, less tax, payable to holders registered on March 17.

LEIGH SMOKELESS FUELS, LTD.—We understand that this company is about to offer 56,500 £1 ordinary shares at 20s. The company has been formed to make briquettes, patent fuel, smokeless fuel, chemicals and by-products. It is acquiring a licence to use certain patents owned by Sutcliffe, Speakman and Co.

THARSIS SULPHUR AND COPPER CO.—The net profit for the year 1923, including £29,146 brought in, amounts to £126,319. The directors recommend a dividend of 4s. per share, equal to 10 per cent., less tax, at 4s. 7½d. in the £1, payable on May 10, leaving £30,225 to be carried forward. The annual meeting will be held at 136, West George Street, Glasgow, on April 16.

NITRATE RAILWAYS CO., LTD.—The directors recommend, subject to final audit of the accounts, a final dividend of 6½ per cent. on the ordinary unconverted shares, making a total dividend for 1923 of 10 per cent., a final dividend of 3½ per cent. on the preferred converted ordinary shares, making a total and maximum divided for the year of 7 per cent., and a dividend of 6s. per share on the deferred converted ordinary shares, being 3 per cent. for the year.

ASSOCIATED PORTLAND CEMENT MANUFACTURERS.—The report for the year 1923 states that the balance brought forward was £227,440, and the revenue for the year, after providing for taxation, amounted to £582,328, making a total of £809,768. After deducting directors' and trustees' fees, debenture stock and other interest, and depreciation reserves and sinking funds, there remains £353,138. The dividend on the preference shares for the year absorbed £125,659, leaving to be carried forward £227,479.

ENGLISH CHINA CLAYS, LTD.—The report for the year 1923 states that the volume of business was greater, both in home and export markets, than in the preceding year, but the demand for china clay in the world's markets is still far below pre-war levels. When the revival of trade comes in the United Kingdom increased sales may be anticipated, but until Russia and Central Europe again become effective customers the capacity of china clay companies will continue largely in excess of the world's demands. The net profit was £91,918 and £15,354 was brought in making a total of £107,272. The directors recommend a final dividend of 2½ per cent. (making 4½ per cent. for the year) on the ordinary shares; to general reserve £15,000, carrying forward £13,987. The annual meeting will be held at the Institute of Chartered Accountants, Moorgate, London, on April 29 at noon.

BEDE METAL AND CHEMICAL CO., LTD.—The annual report states that the operations for the year, after allowing for general management expenses and income tax, have resulted in a loss of £1,093. To this must be added the debit balance brought forward from the previous year, £29,932, leaving a debit of profit and loss account of £31,025. Having regard to the prolonged depression in copper, iron, steel and kindred trades, accentuated by the succession of industrial disputes, the directors consider that the result of the year's operations is satisfactory. The improvements to the works have enabled the company to produce its various manufactures at much less cost than during recent years. The directors are pleased to report that production operations at the company's mine in Norway, which had practically been suspended for the past three years, have now been partially resumed, some contracts for pyrites having been booked for present and future deliveries to British and foreign customers.

New Chemical Trade Marks

Applications for Registration

[*This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, 51 and 52, Chancery Lane, W.C.2, from whom further information may be obtained. Opposition to the Registration of the following Trade Marks can be lodged up to May 9, 1924.*

"NEFOLIA."

445,434. For chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2, merchants and manufacturers. February 15, 1924.

"DIAZOTISABLE COLOUR-BASES AZANIL BRAND."

444,927. For diazotisable colouring matters. Farbwerke vorm. Meister Lucius and Bruning (a Corporation organised under the laws of Germany), Hoechst am Main, Germany, manufacturers. January 30, 1924. (To be Associated. Sect. 24.)

"DOUBLE LETTER MAN."

443,830. For chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Nicholsons (Newcastle-on-Tyne, Ltd.), St. Ann's Works, Heaton Junction, Newcastle-on-Tyne, manufacturers. December 20, 1923. (To be Associated. Sect. 24.)

"SLIX."

445,483. For American carbon black. G. H. B. Brotchie and Co., Ltd., 32, Fenchurch Street, London, E.C.3, merchants. February 18, 1924.

"STAINCOL."

446,096. For preparations for preserving and staining wood. Stainsby and Lyon, Ltd., Aire Tar Works, Knottingley, Yorkshire, tar distillers. March 8, 1924.

"MAXIPHOS."

445,271. For phosphatic fertilisers. Arthur Ingram Moffat, trading as Thomas Moffat and Son, Glen Villa, Oxenholme, Kendal, and 28a, Finkle Street, Kendal, Westmorland, agricultural merchant. February 9, 1924.

"GLYCODERM."

444,124. For chemical substances prepared for use in medicine and pharmacy. S. Stonier and Son, Coalpit Hill Road, Talk o' th' Hill, Staffordshire, chemical manufacturers. January 3, 1924.

"DIAZOTISABLE COLOUR-BASES AZANIL BRAND."

444,928. For diazotisable colouring matters. Class 4. Farbwerke vorm. Meister Lucius and Bruning (a Corporation organised under the laws of Germany), Hoechst am Main, Germany, manufacturers. January 30, 1924. (To be Associated. Sect. 24.)

Dyestuff Licences for March

THE following statement relating to applications for licences under the Dyestuffs (Import Regulation) Act, 1920, made during March has been furnished to the Board of Trade by the Dyestuffs Advisory Licensing Committee:—

The total number of applications received during the month was 534, of which 415 were from merchants or importers. To these should be added 17 cases outstanding on March 1, making a total for the month of 551. These were dealt with as follows:—Granted, 420 (of which 380 were dealt with within seven days of receipt); referred to British makers of similar products, 83 (of which 69 were dealt with within seven days of receipt); referred to Reparation supplies available, 26 (all dealt with within two days of receipt); outstanding on March 31, 1924, 22. Of the total of 551 applications received, 475 or 86 per cent. were dealt with within seven days of receipt.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

GEM AGENCIES, Geach Street, Summer Lane, Birmingham, polish manufacturers. (C.C., 12/4/24.) £14 18s. 6d. March 5.

WOODBROOK DRUG CO., Vale Place, Merridale Street, Wolverhampton, drug manufacturers. (C.C., 12/4/24.) £19 14s. 6d., March 4; and £18 6s. 10d., February 26.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

GRAYS DYES AND COLOURS, LTD. (M., 12/4/24.) Registered March 28, £10,000 debentures and bonus of 2 per cent.; general charge. *Nil. May 17, 1923.

TAYLORS' DRUG CO., LTD., Leeds. (M., 12/4/24.) Registered March 26 and 28, £2,400 and £900 mortgages, to Miss F. N. Armitage, Hookholm, Park View Crescent, Roundhay, Leeds; charged on 11, Holmside, Sunderland, and 15, Toll Gavel, Beverley. *£104,858 13s. 10d. September 17, 1923.

WHIPMAN (P.) AND CO., LTD., London, E.C., drug merchants. (M., 12/4/24.) Registered March 27, £3,000 debenture, to J. Bolloten, Regent Palace Hotel, Piccadilly, W.; general charge. *——. January 30, 1923.

Satisfaction

TURNER (JOSEPH) AND CO., LTD., Chester, chemical manufacturers. (M.S., 12/4/24.) Satisfactions registered March 27, all moneys, etc., registered December 13, 1919; also registered March 31, £20,000, registered August 20, 1920, October 18, 1920, and May 5, 1921.

London Gazette

Company Winding Up Voluntarily

BRITEX CHEMICAL PRODUCTS, LTD. (C.W.U.V., 12/4/24.) D. Haslett, 26, Audrey House, Ely Place, appointed liquidator.

Bankruptcy Petition

CHALMERS, Robert Sawers, sometime carrying on business as R. S. CHALMERS AND CO., at 58, West Regent Street, Glasgow. (S.B.P., 12/4/24.) A sequestration petition has been presented at the instance of The Rosin and Turpentine Import Co., Ltd.

Bankruptcy Information

CASSELL, Hedley, lately trading as HEDLEY CASSELL AND CO., "Argruard," Elm Tree Avenue, West Bridgford, Nottinghamshire, patent medicine manufacturer and vendor. (R.O., 12/4/24.) Receiving order, April 2. Debtor's petition.

Partnership Dissolved

TURNER AND TOMLINSON (Harry William TOMLINSON and William TURNER), dyers and cleaners, 30, Packington Road, South Acton, Middlesex, by mutual consent as from March 15, 1924. Debts received or paid by H. W. Tomlinson who continues the business.

New Companies Registered

ANGOLEUM OIL CO. (1924), LTD., 4, Post Office Avenue, Southport. Dealer in and blender of oil, grease, spirit and disinfectants. Nominal capital, £4,500 in £1 shares (4,000 ordinary and 500 10 per cent. cumulative preference).

DAVIS BROTHERS, LTD., 13A, Derby Road, South Hackney, London. Varnish, polish, japan and vinegar manufacturers, colour and glue merchants. Nominal capital £5,000 in £1 shares.

EAST YORKSHIRE CHEMICAL CO., LTD., 7, Lower Grosvenor Place, London, S.W.1. Manufacturing chemists and druggists, etc. Nominal capital, £5,000 in £1 shares.

FERRANTI GREATREX AND CO., LTD., 31-2, King William Street, London. E.C., metallurgists, tallow melters, tanners, artificial manure makers, etc. Nominal capital, £,1000 in £1 shares.

JOB, IVORY AND CO., LTD., Tower Building, Water Street, Liverpool, manufacturers, refiners and purifiers of and dealers in oil, fat, grease, tallow, etc. Nominal capital, £25,000 in £1 shares.

A. D. KEELING AND CO., LTD., Warstone Metal Works, Hall Street, Birmingham. Manufacturers of and dealers in new and old metals, ores and residuals, metallurgists, chemists, smelters, etc. Nominal capital, £15,000 in £1 shares.

STANDARD PRODUCTS, LTD. Manufacturers of and dealers in paper of all kinds, and carbonising products and textile materials, ink manufacturers, etc. Nominal capital, £5,000 in £1 shares. Solicitors: Wild, Collins and Crosse, Kennans House, Crown Court, Cheapside, E.C.2.

Tariff Changes

CZECHO-SLOVAKIA.—The following have been added to the list of articles exempted from import licence and import declaration requirement:—Stearic acid; camphor; dye woods; quebracho and other tanning woods; madder extract; garancine and garancinebe; litmus; sepia; retorts; crucibles; muffles; fertilising salts; crude borax; crude tartar; dried wine lees; crude potash; salts of aluminium, iron, chromium, nickel, and cobalt, specially mentioned in the tariff, except aluminium chloride and pyrolignite of alumina; sulphide of arsenic; seleniferous deposit; chloride of sulphur; lampblack; ground chracoal; starch glue and similar glue substitutes not specially mentioned in the tariff; collodion; chloroform; methyl alcohol; acetone, pure acetic acid, etc.

MEXICO.—Import surtaxes on the following have now been removed: Extracts of dye woods and tanning woods, toilet soap. Modifications have also been made in the tariff on ferromanganese; carbonic, hydrochloric, and sulphurous acids; and various soaps, the present tariff appearing in the *Board of Trade Journal* of April 3, 1924.

Determination of Nitrogen in Coal

IT is officially announced from the Fuel Research Board that experiments made subsequent to the issue of the description of the methods of analysis recommended by the Sampling and Analysis of Coal Committee of the Board have shown that the particular modification of the Kjeldahl method for the determination of nitrogen, described in their interim report*, gives perfectly reliable results; there is a close agreement between the results of this method and those obtained by a proved modification of the Dumas method†. It has also recently been proved that copper sulphate is *not* a suitable substitute for mercury, as stated in a footnote on page 7 of the interim report, since its use yields, in general, low results. These notes are now being incorporated as an addendum to the report, but for the benefit of readers who have the earlier issue the information is given here.

* Fuel Research Board, Physical and Chemical Survey of the National Coal Resources, No. 2, "Interim Report on Methods of Analysis of Coal," 1923. Published by H.M. Stationery Office, price 1s. 6d. net, pp. 7, 8.

† "The Estimation of Nitrogen in Coal," by A. Baranov and R. A. Mott, Fuel, 1924, *3*, 31, 49.